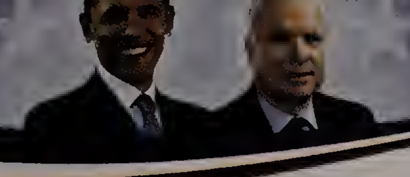


Can the Web predict the next president?
Web traffic numbers and search patterns favor Obama over McCain.
Go online for detailed analysis at **www.nwdocfinder.com/7245.**

NETWORKWORLD

Maximize your return on IT ■ www.networkworld.com October 27, 2008 ■ Volume 25, Number 42

Grim news on start-up front
Funding is hard to come by for network newcomers; IPOs are even rarer. **Page 14.**

Ex-Cisco exec lands at data center start-up

Jayshree Ullal talks about why she decided to join Arista Networks, which makes inexpensive, 10Gbps top-of-rack data center switches. **Page 18.**

Pump up your WAN
Top five tips for improving telecommuter access to your corporate network. **Page 24.**

Smartphones everywhere
Apple and AT&T results buoyed by iPhone; RIM opens BlackBerry Application Storefront. **Page 26.**

Avaya airs its UC centerpiece

BY TIM GREENE

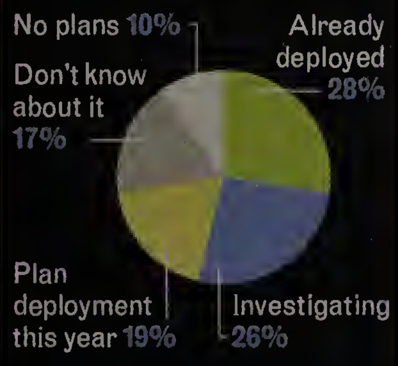
BOSTON — Avaya is set to roll out a core server that will let customers build presence, voice and other unified communications features into business applications.

SIP Application Server software is based on the platform of the same name that Avaya bought last year when it acquired Ubiquity Software. Ubiquity had developed the platform for carriers to create new customer services, but Avaya has modified it

See Avaya, page 16

Who wants unified communications?

Nearly half of corporations surveyed by IDC have unified communications or plan to deploy it sometime this year.



SOURCE: IDC

NEWSPAPER ■ $5.00

Mixed Windows/Linux shops have hands full

BY JOHN FONTANA

The sprawl of management consoles, the proliferation of data they provide and the rising use of virtualization are adding challenges to corporations looking to more effectively manage mixed Linux, Windows and cloud environments.

Traditional standards are being tapped in order to bridge the platform divide, and new ones are being created to handle technologies such as virtualization that create physical platforms running one technology but hosting virtual machines running something completely different. The goal is better visibility into what is going right or wrong — and why — as complexity rises on the computing landscape.

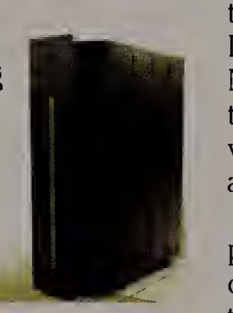
Moving towards that goal the management-standards stalwart Distributed Management Task Force (DMTF) last month began hammering out virtualization management standards it hopes will show up in products next year. Those standards will address interoperability, portability and virtual machine life-cycle management, as well as incorporate time-honored management standards, such as the Common Information Model (CIM).

Such vendors as Microsoft, VMware and Citrix Systems are onboard with the DMTF, and are creating and marketing their own cross-platform virtualization-management tools for x86 machines. Linux vendors, including Novell and Red Hat, and traditional management vendors, such as HP, also are joining in.

To underscore the importance of heterogeneous management, rather than relying on third-party partners, Microsoft is supporting Linux in its virtualization management tools slated to ship by year-end. In addition, the vendor said in April it will integrate the OpenPegasus Project, an open source implementation of the DMTF's CIM and Web-based Enterprise Management (WBEM) standards, so it can extend its monitoring tools to other platforms.

The trend toward services is forcing IT to think about management across systems that may have little in common, including the same LAN. Services increasingly are made up of numerous application components that run internally and externally; that complicates efforts to oversee the pieces

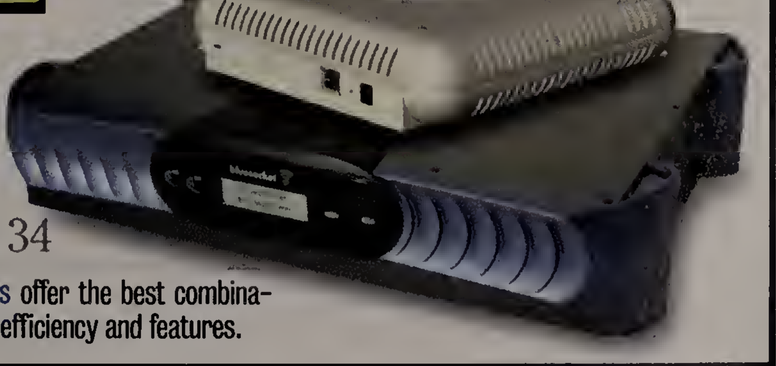
See Mixed, page 19



IBM is taking aim at Linux users with its small mainframe. Page 16

NETWORKWORLD CLEAR CHOICE

WLAN ACCESS POINTS



New 802.11n gear 10 times faster than current Wi-Fi offerings. Page 34

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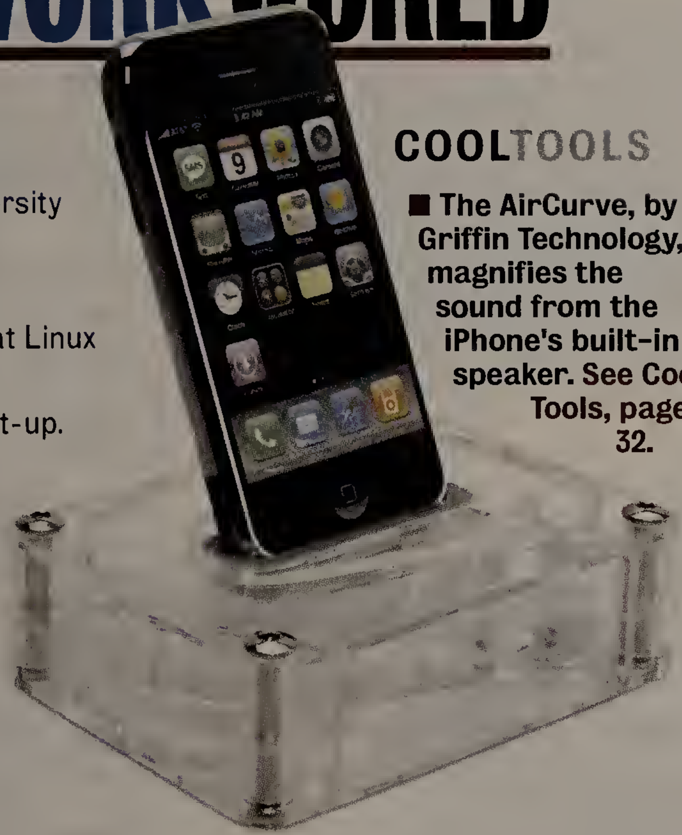

COOLTOOLS

■ **The AirCurve, by Griffin Technology, magnifies the sound from the iPhone's built-in speaker. See Cool Tools, page 32.**

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32 **Keith Shaw:** Two more handy iPod/iPhone add-ons.

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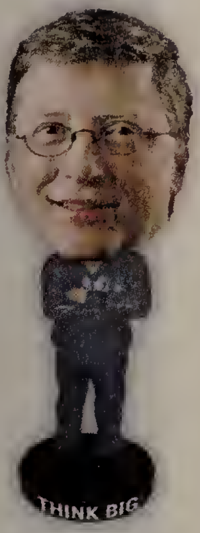
New 802.11n gear 10 times faster than current Wi-Fi offerings. Page 34

Bluesocket's BlueSecure APs offer the best combination of performance, power efficiency and features.

GOODBADUGLY



Gates still thinking big
The *Puget Sound Business Journal*'s TechFlash.com reports that Bill Gates is forming a think tank with the cryptic name of bgC3 LLC that in part includes his initials. One source says the company will coordinate Gates' business and charitable endeavors.

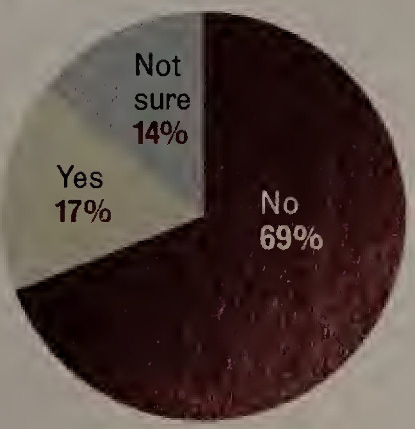
Sun: It's misunderstood
The investment company that announced last week it has taken a 21% stake in Sun believes the market doesn't get the company. "[Sun] is kind of interesting because it's progressively less of a server company and more of a software company; it's more about Solaris and Java," said Saley Cates, president of Southeastern Asset Management, at a shareholder meeting. "And that's kind of a change that we don't think the market's on to at all."

Lesson learned about botnets
A 22-year-old University of Pennsylvania student has been sentenced to three months in prison and probation time, following a worldwide botnet computer bust. Ryan Goldstein had been facing as much as five years in prison on a computer-fraud charge after he was rounded up as part of the FBI's Operation Bot Roast II. Goldstein, who went by the online handle Digerati, was waging online war with three Internet Relay Chat networks and a now-defunct Web site.

POLL

A snapshot of how networkworld.com visitors voted on a key networking issue last week:

Are you in favor of the $700 billion Wall St. bailout bill?



Total voters for this poll: **209**

Vote and discuss: www.nwdocfinder.com/7237

Wireless density considerations

Re: University reduces AP density — for voice (www.nwdocfinder.com/7226):

Since 802.11abgn is not a broadcast environment where the signal to noise ratio matters only at the client, client antenna gain as well as transmitter power needs to be considered. If you look at manufacturers' specifications for small embedded antennas, some have a peak gain as low as 1 dBi in the best direction. They often run 0 dBi to -4 dBi in some directions, with an efficiency around 60%. This means client EIRP would be 2 to 6 dB below an AP that uses two dBi antennas, at the same output power. If the client devices are rated in RF power, instead of EIRP, gain should be considered.

> “I can see why Microsoft is all over this report. It's in their favor. If the report were just accurate it would be an even bigger coup.”

Measurements from clients support this calculation. In a balanced WLAN environment where desirable SNR at each radio is close to the same, even lowering power to 20 mW from an AP with efficient antennas is not the same as 20 mW from a handset.

Using higher power in a device used for long periods of time while touching someone's head or body may be increasing the health risk.

Charles Preston

Discuss at www.nwdocfinder.com/7227

Hyper-V vs. VMware

Re: The Early Returns - VMware slipping To Hyper-V. Prediction on track (www.nwdocfinder.com/7228):

I can see why Microsoft is all over this report. It's in their favor. If the report were just accurate it would be an even bigger coup.

Here's the main points you need to know about this report from IDC:

1) This was a small sampling using just the OEM's numbers.

2) How do you count unit shipments for free products not delivered by the OEMs?

3) Microsoft only went up 5% from the previous measure.

4) VMware also went up 2% from the previous measure.

5) Hyper-V was only shipping for 2 business days in Q2 2008. There was no Hyper-V impact to these market share numbers.

6) VMware still commands a huge lead in actual product use.

7) There are real factual errors throughout the report.

8) This was a sponsored report with no input on revenue, shipment details, or feedback from VMware.

Mike DiPetrillo

Discuss at www.nwdocfinder.com/7228

Avast!

Re: Microsoft lauds global antipiracy success (www.nwdocfinder .com/7229):

This is really quite breathtakingly tasteless given the recent news coverage of, oh look, actual robbery and murder at sea off the coast of Somalia. Yes, copying that floppy is exactly like that. Offensive idiots.

David Gerard

Discuss at www.nwdocfinder.com/7230

Gibbs needs to FLOSS

Re: Four tactics for surviving the doom and gloom (www.nwdocfinder.com/7231):

For all your sage offerings you neglected to mention the implementation of Free/Libre Open Source Software. While I agree with TANSTAAFL I can also point to many cost advantages of FLOSS.

William "Papa" Meloney

Discuss at www.nwdocfinder.com/7232

Robot wars

Re: Android Market to open to any app Monday (www.nwdocfinder.com/7235):

Kudos to Google. Hopefully this will bring down the walled gardens.

I should comment that it only took Apple four days from submission for zhiing (www.nwdocfinder.com/xxxx http://www.zhiing.com/) in the app store. As you probably know, zhiing has been very active in the pursuit to get the application working on all devices and all networks.

Hopefully Verizon will wake up and turn on their LBS without that stupid service fee.

Victor Lund

Discuss at www.nwdocfinder.com/7236

E-mail letters to jdix@nww.com or send them to John Dix, editor in chief, Network World, 492 Old Connecticut Path, Framingham, MA 01701-9002. Please include phone number and address for verification

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Google Analytics gets more enterprise-savvy. The Google Subnet blog reports: "Google Analytics has always been a good, free alternative to the more in-depth, pricier Web analytics suites out there. But it was relatively bare-boned, and lacked some key capabilities for enterprise sites. With those shortcomings in mind, Google announced that it has updated the service in an effort to make it a bit more enterprise-savvy. Google Analytics lets Web site administrators keep detailed statistics on site visitors, including time of visit and pages viewed. The new upgrades are all aimed at enabling users to get more detailed, customized insight into that data."
www.nwdocfinder.com/7238

How Gomez handles app performance measurement. Peter Sevcik and Rebecca Wetzel write in their App Performance View blog, "At a Gomez users' meeting held after last week's Web Experience Forum, users provided great commentary about how they use Gomez services to ensure good performance-including how they are using Apdex. Imad Mouline, Gomez' CTO, described where all of the Gomez application performance measurement services fit into an application management maturity scale of availability, response time, and consistency (good performance for all users all the time). The Gomez Business Pulse XF portal integrates the views and leverages web standards (e.g., XML and SOAP) built into its measurement services to make it easy to tailor your own web service performance view."
www.nwdocfinder.com/7239

How much is your certification worth? Andrew Mikols writes in his The Windows Job Market blog, "How does certification affect your employability, salary, and advancement opportunities? According to RedmondMag's annual salary survey, the average salary of an MCP or better is $77,244 USD, and the average salary of a similar skill set without certification is $84,839 USD. ... Even if certification has an uncertain impact on your salary, there are some things it definitely does demonstrate. For example, certifications such as MCSE and MCAD and MCA required a series of classes and exams over a time period often exceeding one year. It shows dedication and commitment and focus for the individual who can persevere long enough to finish their certification. ... But once you are hired, only a small percentage of employers place much emphasis on keeping your certification current and acquiring more certifications."
www.nwdocfinder.com/7240

IT VIDEO

INTERVIEWS, THE COOLEST TOOLS AND MORE

GADGETS:

Google Android hits the streets

The first cell phone based on Google's Android platform went on sale last week in San Francisco ahead of the start of sales across the United States on Wednesday.

www.nwdocfinder.com/7242

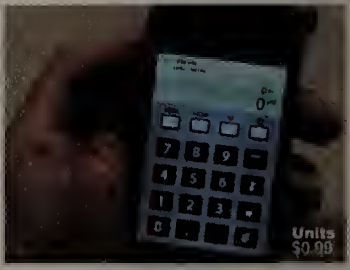
TECH UPDATE 2.0:

How to fight software piracy

Software piracy can be battled on a number of levels. Victor DeMarines of V.I. Labs outlines some promising new antipiracy measures implemented at the application level.

www.nwdocfinder.com/7243

IPHONE APP O' THE WEEK:



Units

Need to convert units of measurement quickly? Fire up the Units application on your iPhone to figure out how many meters in a mile, and much more.

www.nwdocfinder.com/7244

BEST OF NW'S NEWSLETTERS

Economic crisis fuels job concerns

Training: The economic crisis seems to be getting worse by the week. Should IT pros be worried about getting laid off? The possibility certainly exists, especially in the financial sector, but some job market observers say there have not been widespread impacts on IT workers so far. Outside of the financial services segment, "we haven't seen it trickle down into hiring of IT resources ... as much as we would have thought by now," Sean Ebner, vice president of professional services for Technisource, told me recently. "There still seems to be a healthy demand for technology resources." IT executives remain cautiously optimistic overall, David Foote, CEO and chief research officer of IT workforce research firm Foote Partners, said in an interesting interview published by *Computerworld* this week. But about 40% of companies have cut their 2008 IT budgets, Foote said. "Bottom line, considering the lag time between business decisions and direct labor-market effects, we won't see much IT workforce reduction or jobs being outsourced this quarter, except perhaps those that are bankruptcy-related," Foote told *Computerworld*. "But starting next year, thousands of permanent IT professionals will be incrementally cast off from employers large and small. Many will find new employment, join the ranks of the 'partially employed' or return to school. This isn't a big deal, though, considering that the overall size of the U.S. IT workforce is approximately 4 million."
www.nwdocfinder.com/7223

Wireless: First it was pit bulls and then it was pigs. Can we now add cows and colts to the list of metaphorical lipstick-wearing politicos this campaign season? This time around, the McCain campaign is dabbing some lipstick on controversial moves by Verizon Wireless and AT&T to provide McCain campaign headquarters with temporary cellular infrastructure free of charge. The McCain ranch near Sedona, Ariz., apparently gets lousy cell coverage. According to a *Washington Post* article last week, the McCains got VIP treatment from Verizon Wireless, which installed a cell-site on wheels (COW) nearby in June, gratis, so campaign staff and Secret Service agents could have coverage. AT&T — not to be outdone — hastened to the scene with a cell-site on a light truck (COLT) in July. Most cellular operators have some number of portable cell towers, which they dispense on an as-needed basis to fill in coverage gaps, most often for disaster recovery during emergency situations. For example, 100 COWs were used for wireless priority service during Hurricane Katrina, according to a 2007 FCC report.
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Microsoft says Windows flaw could bring worm attack

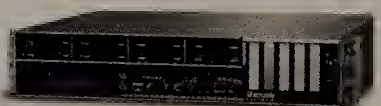
Microsoft fixed a critical bug in its Windows operating system last Thursday, saying that it is being exploited by online criminals and eventually could be used in a widespread worm attack. Microsoft took the unusual step of issuing an emergency patch for the flaw, several weeks ahead of its regularly scheduled November security updates. The flaw lies in the Windows Server service, which is used to connect such network resources as file and print servers over a network. By sending malicious messages to a Windows machine that uses Windows Server, an attacker could take control of the computer. "It is possible that this vulnerability could be used in the crafting of a wormable exploit. If successfully exploited, an attacker could then install programs or view, change, or delete data; or create new accounts with full user rights," Microsoft said in a bulletin. **www.nwdocfinder.com/7246**

New CEO makes changes at VMware. Three months after being made VMware's CEO, Paul Maritz announced changes at the company that are designed to help it ride out the economic storm while changing from a fast-growing start-up into a mature software company. The changes include a hiring freeze that started during the third quarter and probably will last into 2009. Maritz also will divide VMware into separate business units to handle different areas of product development, and appoint new senior executives to manage those divisions. The changes were announced after VMware reported solid third-quarter financial results, including profits that were ahead of expectations. They also come as the IT industry braces for an expected slowdown in customer spending, and as VMware in particular exits a heady period of rapid growth. **www.nwdocfinder.com/7247**

Paul Maritz

IDC: Economic crisis to bolster cloud computing. The current economic crisis in the United States may have a silver lining for IT companies that invest in cloud computing, because it will contribute to significant growth in that sector over the next five years, according to research firm IDC. Based on a survey of IT executives, CIOs and other business leaders, IDC expects spending on IT cloud services to reach $42 billion by 2012, a threefold growth that in part will be bolstered by the U.S. economic crisis that is spreading around the world. "The cloud model offers a much cheaper way for businesses to acquire and use IT — in an economic downturn, the appeal of that cost advantage will be greatly magnified," said Frank Gens, senior vice president and chief analyst at IDC. "This advantage is especially important for small and medium businesses, a sector that will be a key target in any plan for recovery." **www.nwdocfinder.com/7248**

Rackable steps up enterprise push. Rackable Systems, which is best known for providing servers to such large Internet companies such as Amazon, Facebook and Yahoo, is aiming for a bigger slice of the enterprise market with its new C2005 server. Rackable said the build-to-order server is its "most versatile yet," meaning customers can configure the C2005 with the storage, I/O and processors that best suit their needs, be that for an enterprise database application or a specialized program for crunching search queries. The options include a variety of motherboards based on microprocessors from Intel and Advanced Micro Devices, as well as several local-storage options, including 2.5- and 3.5-inch solid-state drives. **www.nwdocfinder.com/7249**



Researchers find problems with RFID passport cards. RFID tags used in two new types of border-crossing documents in the United States are vulnerable to snooping and copying, a researcher said last week. United States Passport Cards issued by the U.S. Department of State, and enhanced driver's licenses (EDL) from the state of Washington contain RFID tags that can be scanned at border crossings without being handed over to agents. In a cloning attack, the information in these tags could be copied on to another off-the-shelf tag, which might be used to impersonate the legitimate holder, the researchers said. Another danger is that the tags can be read from as far as 150 feet away, so criminals could read them without being detected. In addition, hackers could cause EDLs to self-destruct by sending out a certain number, said Tadayoshi Kohno, an assistant professor of computer science and engineering at the University of Washington. **www.nwdocfinder.com/7250**

Sun tussles with start-up over noted systems designer. Sun Microsystems went into spin mode last week after start-up company Arista Networks (read our Q&A with Arista's new CEO, page 18) announced it had snared Andy Bechtolsheim, Sun's chief scientist and a highly regarded systems designer, to be its chief development officer. The announcement led to a flurry of reports that Bechtolsheim had resigned from Sun, something the systems and software company strongly denied. Sun called the reports inaccurate and said that Bechtolsheim will "continue his present involvement" with Sun, albeit on a part-time basis. Bechtolsheim later confirmed that he works full time at Arista, where he also is chairman and co-founder, but that he'll continue to advise Sun on a part-time basis and "no more than one day a week." **www.nwdocfinder.com/7252**

Certain IT skills shine in uncertain times. Despite the ongoing financial turmoil, workers with specific high-tech talents will continue to be in demand, according to Robert Half International. Specifically, Web developers are in demand because of the rise of social media and Web 2.0 initiatives within companies. Programmer analysts, or IT professionals with .Net, SharePoint, Java and PHP skills, also are in demand across such industries as healthcare, finance and manufacturing. Help-desk professionals capable of troubleshooting a broad range of problems also will be sought after, according to the staffing firm. In addition, Robert Half International estimates that IT salaries could increase by about 3.7% next year, in part because of a smaller pool of skilled candidates and fewer college graduates with IT-related degrees. **www.nwdocfinder.com/7254**

Optical encryption called capable of 100Gbps. Researchers have created an optical network component that they say can encrypt data traveling at 100Gbps, far outpacing current electronic encryption technologies. The component, a passive optical coder that can be programmed remotely to change the encryption key, could enable carriers and large enterprises to secure the data that travels over a high-speed WAN connection, according to Shahab Etemad, chief scientist director at Telcordia Technologies. **www.nwdocfinder.com/7253**

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P2P legislation forcing university IT to get tough

BY ELLEN MESSMER

New legislation is putting pressure on U.S. colleges and universities to do a better job combating illegal file-sharing — and it's taking a toll on campus IT departments, according to research published last week.

A law passed by Congress and signed by President Bush in August requires the nation's 4,400 public and private colleges and universities to address the issue of illegal peer-to-peer (P2P) file-sharing of digital content on campus.

Buried in the Higher Education Opportunity Act of 2008 are requirements that campuses inform students that illegal distribution of copyrighted materials, such as music and movies, is subject to criminal and civil penalties. The law requires college and university management to certify to the U.S. Secretary of Education that they have developed plans to "effectively combat" illegal P2P file-sharing.

The law also strongly encourages the use of technical measures to monitor and block illegal P2P, and some observers in academia expect the U.S. Department of Education will make a mandatory requirement next year.

Beyond trying to stop illegal P2P activity by students on campus networks, the law suggests colleges and universities license digital music services, such as those from Napster, for students.

"The legislation is explicit that campuses are expected to offer an alternative to P2P piracy by licensing a music service such as Napster," says Kenneth Green, founding director of the Campus Computing Project (CCP), which since 1990 has studied the role of IT in American higher education. If this becomes a requirement next year, campuses can expect to pay "six figures" for the kind of licensing envisioned under the legislation, a provision supported by such trade groups as the Motion Picture Association of America (MPAA) and the Recording Industry Association of America (RIAA).

While Green doesn't deny that illegal P2P file-sharing occurs on college campuses across the country, he adds that MPAA and RIAA (which successfully lobbied Congress to get the P2P file-sharing provisions into the 2008 bill) are overstating the problem.

This week the CCP published a survey of 321 colleges and universities to see how they're handling P2P piracy issues. The survey, titled "The Campus Costs of P2P Compliance," also draws on data from CCP's annual, broader 2007 survey of IT on campus.

Survey respondents report the burden for P2P compliance is falling directly on campus IT personnel and is a huge drain on their time. "As high as two IT personnel are involved, which could mean a salary overhead of $150,000 to 200,000," Green says.

The survey found that about 85% of academic institutions inform their students about P2P piracy. Methods vary widely — from simple posters on the wall to more in-depth online tutorials required at some schools, such as Cornell University, to teach students rights and responsibilities before they use the college network, Green says.

The survey report states that "college students have been an understandably easy target for the music industry's anger about P2P file-sharing and by extension, declining CD sales."

In some places, the money spent on P2P compliance is topping half a million dollars in cash and personnel time. Still, CCP surveys from the recent past indicate that many IT personnel don't believe that technology approaches are altogether effective in stopping P2P piracy.

"Technology managers on campus say P2P-killer software doesn't work," Green says, adding that he's skeptical of the support for the tech-oriented approach advocated by some in Congress, including Rep. Bart Gordon (D-Tenn.), chair of the House Science and Technology Committee, who has publicly said he views technology as the first line of defense.

Doug Camplejohn, CEO of Mi5 Networks, which contends its Webgate product is effective against P2P file-sharing, acknowledges that it is not easy to combat. "P2P applications in general are the most evasive invented," he says. "P2P apps, as soon as they are blocked, jump to another protocol to get out." He notes that P2P applications often are used to disseminate such malware as botnets, and are best stopped on any network, not just colleges. ■

P2P DEFENSE SYSTEM

About 25% of public universities have installed technology to combat P2P piracy, according to new Campus Computing Project research.

WEB APPLICATIONS

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InBrief

Microsoft to ship virtualization management software

Microsoft says development is complete on its Virtual Machine Manager 2008 and that the software will be available Nov. 1. VMM is the company's first tool for managing Microsoft's recently released Hyper-V platform, along with virtualization environments from VMware and Xen. VMM helps users configure and deploy virtual machines. It also provides centralized management and provisioning tools. The software is a core piece of Microsoft's System Center family of management tools, including integration with Configuration Manager and Operations Manager. Management has emerged as a core issue in virtualization deployments, and experts say that Microsoft's set of tools may be the strength of its virtualization offerings, which range from the server to the desktop.

Amazon offers hosted Windows, SQL Server instances

Amazon.com's cloud-computing service is offering hosted instances of Microsoft Windows Server and SQL Server, and a service-level agreement guaranteeing 99.95% uptime. The upgrades to Amazon EC2 were announced last week as the online service exited beta mode, two years after its launch. EC2 offers access to virtual-server capacity on a pay-as-you-go basis, letting customers scale capacity up or down at any time. Now EC2 lets customers use Windows Server and SQL Server on EC2 at prices beginning at 12.5 cents per compute hour. Amazon also said it will bolster EC2 with several new features in 2009, including load balancing, better monitoring and an improved management interface.

SAP invests in LinkedIn

SAP's venture capital arm has sunk an undisclosed sum of money into LinkedIn, the business-oriented social-networking site. While there are obvious parallels between the two companies, particularly the current and potential new SAP customers among LinkedIn's reported 30 million-plus members, it's too soon to know exactly what SAP has in mind, observers said. "Bear in mind SAP Ventures is somewhat independent of the mothership — the investment doesn't necessarily mean SAP is looking at a potential future acquisition," said James Governor, an analyst with Redmonk. "However, SAP is clearly thinking about changing notions of identity, community, knowledge and 2.0." SAP's stake is part of a $22.7 million pot raised by LinkedIn.

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Venture money dries up

IPO dry spell contributes to lowest net company investment total in a decade

BY JON BRODKIN

Venture capital investment in network technology companies has hit its lowest point in a decade, and one expert says it might get worse.

Investors are wary of investing in start-ups because they have poured millions of dollars into existing companies that have not provided liquidity yet in the form of IPOs or mergers and acquisitions, says Tracy Lefteroff, a global managing partner of Pricewaterhouse Coopers.

"I couldn't point to anything that's done really well [in the networking sector]. The whole space is suffering," Lefteroff says. "If [investors] don't see liquidity on the horizon, it's going to be tough to justify funding a lot of new companies in this space."

Lefteroff predicts that the number of deals and dollar amounts will continue to drop.

Venture capitalists in the third quarter invested $2.07 billion in 328 networking companies, including makers of hardware, telecom products, network-related software and Internet-related technology, according to data provided to *Network World* by Pricewater houseCoopers and the National Venture Capital Association, authors of the quarterly "MoneyTree Report." That's the lowest quarterly total since 1998's first quarter, when investments were slightly less than $2 billion. It's also the fewest number of deals in any quarter since 1996.

A LOW POINT

Venture capitalists in the third quarter invested $2.07 billion in 328 network companies. That's the lowest quarterly total since 1998's first quarter.

Investments soared during the dot-com boom, surpassing $15 billion in each quarter during 2000. Venture funding became much scarcer after the bubble burst, but investments generally remained steady at $2.5 billion and $3 billion per quarter for each of the past five years.

Third-quarter investments dropped almost a full billion compared to last year's third quarter, when 411 deals accounted for slightly more than $3 billion. The latest numbers also show a precipitous drop since this year's second quarter, when 408 deals totaled $2.75 billion.

The current economic crisis clearly is limiting the amounts of money available from venture capitalists. What's most worrying for young companies is that investors are being forced to continue pouring money in late-stage companies that have not been acquired yet or gone public, leaving less money for true start-ups. The Top 10 network deals in the third quarter (see graphic) all went to late-stage and expansion companies. The 11th-biggest deal went to an early-stage company, Jasper Wireless. It's necessary to go all the way down to the 85th-biggest deal to find one that went to a company in the start-up or seed phase — Schooner Information Technology, a data access company led by veterans of Sun.

There were 34 start-up or seed venture deals in the network space during the third quarter, about the same as the 36 deals in last year's third quarter. The dollar amount dropped, however, from $100 million for start-ups in the third quarter of 2007, to less than $80 million in the third quarter of 2008.

This happened largely because later-stage companies aren't providing liquidity to investors, Lefteroff says. There were zero venture capital-backed IPOs in the second quarter of 2008 in all industries, the first time that's happened in 30 years. There were five IPOs in the third quarter, including venture-backed and other companies, according to Pricewater houseCoopers. One network vendor — Rackspace Hosting — went public in the third quarter. In contrast, 43 venture-capital-backed companies went public in the first half of 2007.

In the future, investors are unlikely to put much money into technology hardware companies that need a lot of capital, such as those in the router, telecom or fiber-optics businesses, Lefteroff says. Storage and servers probably will suffer quite a bit as well. Investors may be more likely to put money into software and services companies because they require less capital, but Lefteroff did not sound confident about any portion of the network technology industry.

"There were fairly significant decreases this year both in deals and dollars, which I think is a trend we may see continue for a while, until we get some liquidity back into the market," Lefteroff says, adding that venture capitalists will be "extremely cautious" about where they put their money for the next couple of years.

There was some good news this week for LinkedIn, a business-networking site that raised $22.7 million from investors, including SAP. ■

Top 10 network venture-capital deals in Q308

Company, location	Focus	New funding
Trilliant, Redwood City, Calif.	Wireless-network products for grid management applications.	$40 million
Mimix Broadband, Houston	Semiconductors for the millimeter-wave market.	$36 million
3Leaf Systems, Santa Clara, Calif.	Systems software and virtualization technologies for the enterprise server market.	$35 million
Mail.com, El Segundo, Calif.	Web-based e-mail services for consumers.	$32.4 million
Riya, San Mateo, Calif.	Visual search engine under the name Like.com.	$32.3 million
Vanu, Cambridge, Mass.	Waveform software and design consulting services.	$32 million
Lightwire, Allentown, Penn.	Interconnection products using CMOS optoelectronics	$30.9 million
Greenplum, San Mateo, Calif.	Database products for businesses.	$29.6 million
Palo Alto Networks, Sunnyvale, Calif.	Enterprise network-security products.	$27 million
JumpTap, Cambridge, Mass.	End-to-end, carrier-branded mobile search products.	$26 million

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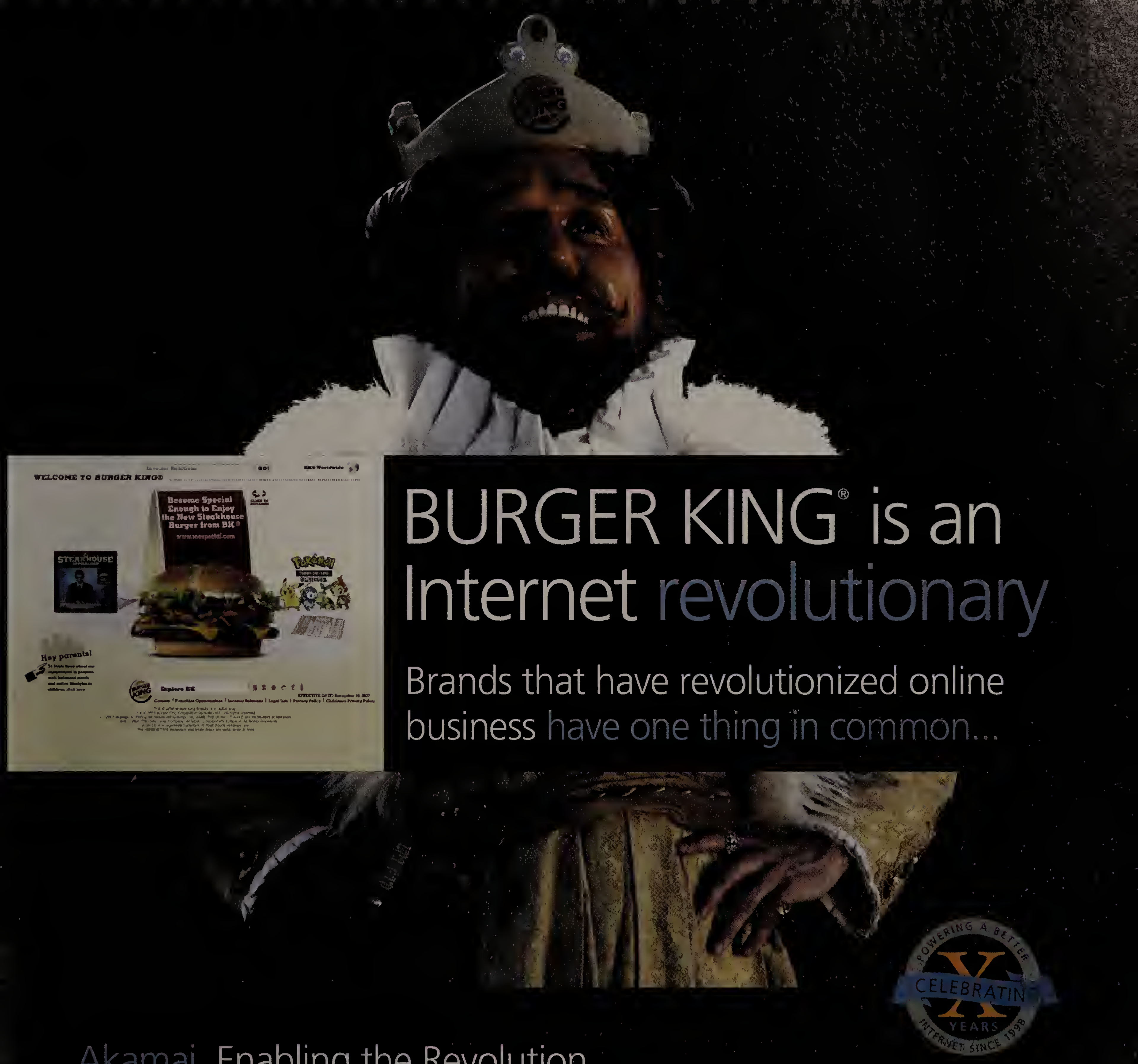
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Avaya

continued from page 1

for deployment in corporate networks, the company says.

SIP Application Server unifies access to such shared resources as media servers and presence servers and to such communications services as messaging and recording, says Karyn Mashima, Avaya's senior vice president for strategy and technology, who spoke during the company's analyst conference last week.

Developers who want to incorporate these or other features into business applications can write code to the server, which will draw in the other elements needed to execute them. For example, a supply-chain application that lists vendors could be written so that running a mouse over the name tells their presence status, and clicking on the name calls them on the phone. The application would interface directly with SIP Application Server, which would interact with the presence server and the call server to enable the features.

Initially, Avaya will write its own applications for SIP Application Server, but eventually will open it up to independent software vendors and customers, says interim CEO Charles Giancarlo.

The server parallels efforts by Microsoft with its Unified Communications Server, Cisco with its WebEx Connect, Siemens with its OpenScape Unified Communications Server and NEC with its Spherical Web Services, says Zeus Kerravala, an analyst with the Yankee Group. "The winners of UC long term will be those that figure out how to make UC pervasive," Kerravala says. "How do I get presence capability into more applications, click-to-call into more applications? To me, that's more important than the UC platforms themselves because that's what will make UC ubiquitous."

According to an IDC study published in August, many businesses are interested in unified communications, with about a quarter of those deploying it in a few branch offices, about a fifth saying they did so at a large number of sites and about a fifth saying they deployed it corporatewide.

The Avaya server is scheduled to be available next year, Giancarlo says. The vendor also plans upgrades to its endpoint software in phones and softphone agents on laptops and desktops, he says. The goal is to make the endpoints function as intuitively as cell phones do and to embrace consumer and social-networking tools that users understand and find useful outside the office, Giancarlo says.

For example, an incoming call to a call center might trigger a pop-up on an IP phone that shows the Facebook or LinkedIn profile of the caller, Mashima says.

Avaya customers can expect some changes in the way the vendor interacts with them as well, Giancarlo says. Traditionally, PBX vendors went through telecommunications managers, and later IP PBX vendors approached IT directors. That will continue, but Avaya also will bring in users from customer business units, he says. The idea is to better understand what business tasks customers are trying to perform and to facilitate them via the unified communications platform. "No other vendor is fully focused on individual users, department managers or division heads," he says.

Avaya also is shifting its sales model to make more use of its channel partners to install products that customers buy. The aim is to have at least 85% of customers handled by channel partners, says Todd Abbott, a senior vice president of sales and Avaya's president of field operations.

Avaya has set a goal to make more customer interactions self-service, so people buying software or upgrading software can do so online.

Giancarlo says Avaya and Cisco are the two unified communications vendors financially stable enough to weather the current economic problems well, and Avaya will actually benefit from them. "It's a great opportunity. During a downturn is when market-share changes happen, and this is our time to pick up market share," he says.

Avaya earned $5.2 billion in revenue during the fiscal year that ended Oct. 1 and has $677 million cash on hand, Giancarlo says. "Cash is good leverage to have going into '09," he says.

Avaya has sorted through possible permanent CEOs to replace Giancarlo, who stepped in after former CEO Lou D'Ambrosio stepped down for health reasons last June. Giancarlo says the vendor has narrowed the field to a select group of well-qualified candidates and will announce its choice early next year. ■

IBM aims jr. mainframe at Linux customers

BY JON BRODKIN

IBM is targeting midsize business customers that use Linux with a new, "baby" mainframe that costs a fraction of what it charges for the high-end mainframe it released in February.

The System z10 Business Class (z10 BC) follows in the tradition of IBM refreshing its primary mainframe product, then following up several months later with a stripped-down, less-expensive version, says Forrester analyst Brad Day. The so-called "baby mainframe" is a pretty strong machine on its own, however, and it lets IBM compete more aggressively against various RISC and Itanium-based servers, as well as high-end x86 and x64 machines, he says.

"This is a Paul Bunyan version of the baby mainframe," Day says. IBM clearly is making a move against such vendors as HP, Sun and Fujitsu that are targeting legacy customers with mainframe migration programs, he says.

IBM has optimized the mainframe for Linux, working with Red Hat and Novell to fix bugs and make sure all drivers run solidly with the Linux operating system, says System z marketing vice president Karl Freund. IBM executives also decided the mainframe simply wasn't inexpensive enough to convince customers to run new Linux workloads, he says.

IBM lowered by 50% the cost of a specialty engine that lets z10 BC run Linux, bringing the price of this add-on capability down to $47,500, according to Freund. Application servers, databases and Web servers probably will be the most common Linux applications to run on the machine, he says. "We're continuing to make the mainframe more mainstream, more interesting to new customers, and more interesting to midsize businesses," he says.

IBM's mainframe has supported Linux for five years, and Big Blue is increasing its push on this front because Linux is becoming a more sophisticated, enterprise-class operating system, Freund says. The mainframe doesn't have a way to run Windows workloads but "it's something we're certainly interested in exploring," he adds.

The z10 BC is nearly 40% faster and has nearly four times the maximum memory of its predecessor, IBM says. It delivers capacity equal that of to 232 x86 servers, while the high-end mainframe delivers capacity equal to nearly 1,500 x86 servers, IBM says.

With the exception of IBM, the mainframe market is pretty much dead, Day says. Customers that have never owned a mainframe are often wary of buying one, but IBM has tried to reinvent the system to operate new workloads, such as ones more commonly run on RISC and Itanium processors. The effort has been successful: Much of IBM's mainframe growth over the last two years can be attributed to new workloads rather than upgrades to pre-existing machines, Day says.

The mainframe has always run data-intensive transaction-processing applications such as those used in the financial and utility industries, Day says. Now it's getting better at running compute-intensive workloads that demand high amounts of CPU and memory, he says.

The z10 BC starts at less than $100,000, about the same as IBM's previous business-class mainframe. Typical deals will range from $250,000 to $500,000 Freund says. The top-of-the-line z10 mainframe announced in February starts at $1 million and the price increases dramatically depending on the configuration. ■

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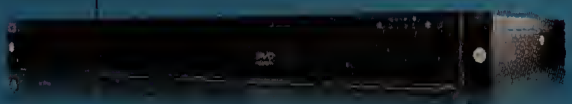

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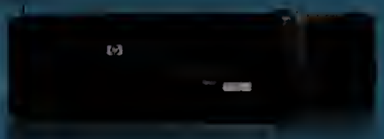

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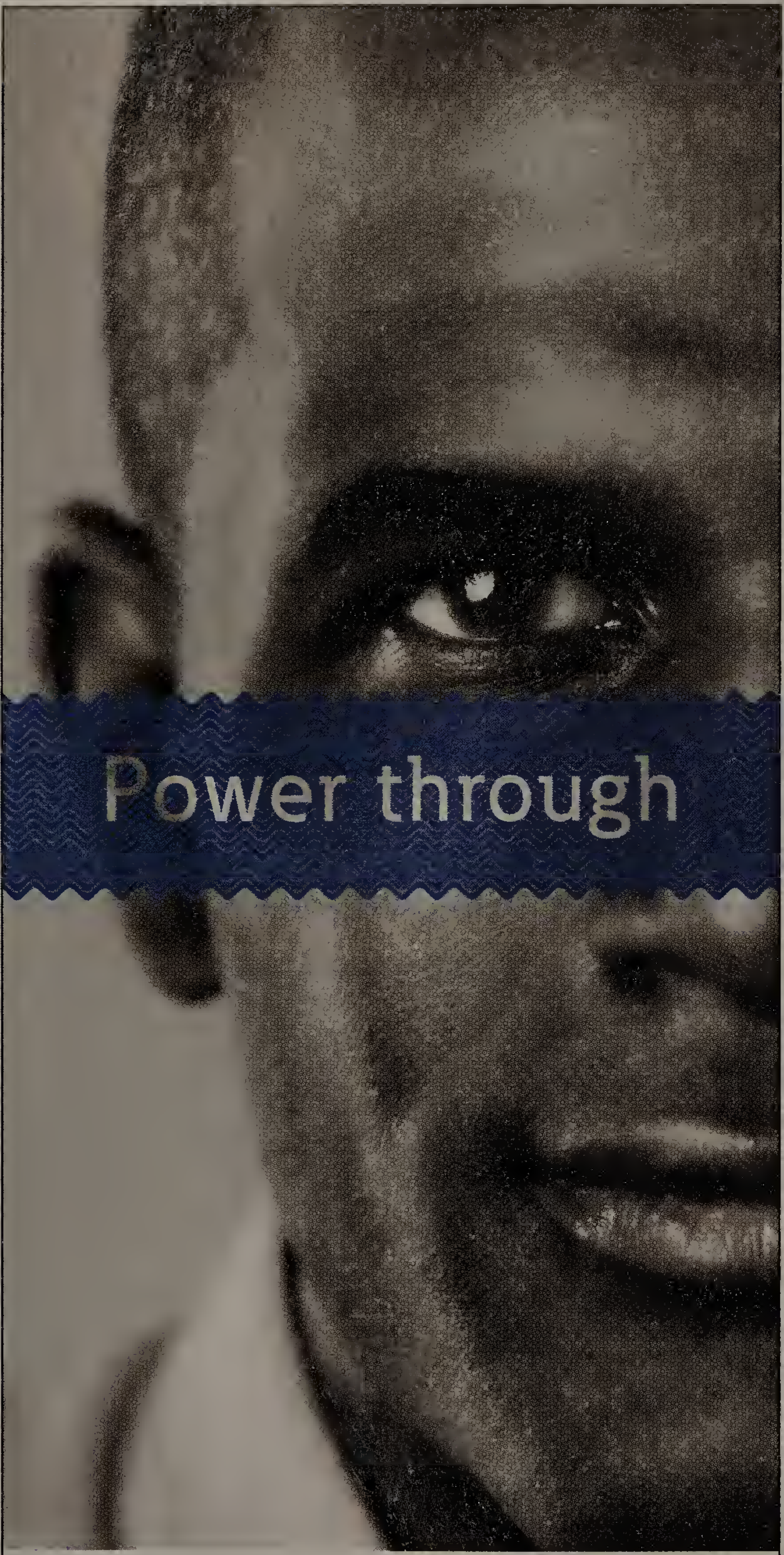

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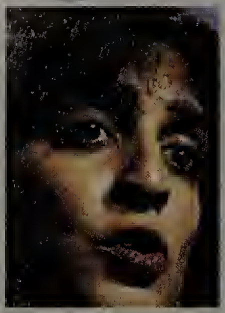
Q&A Ex-Cisco exec drawn to start-up



Former Cisco data center chief Jayshree Ullal last week landed at switching start-up Arista Networks as its new CEO after leaving Cisco in May. Arista, started by Sun co-founder Andy Bechtolsheim (who remains at Sun in a part-time role), made waves last year by packing 48 10-Gigabit Ethernet ports into 1RU for the data center. Ullal spoke with Network World *Managing Editor Jim Duffy about Arista's products, prospects and projections.*

What attracted you to Arista?
I looked over the summer at three types of options — clean tech and energy, software-as-a-service and video. I got approached for CEO and COO opportunities in bigger companies that I viewed as more directly competitive with Cisco. My affections for Cisco don't change just because I leave the company. If you've been there 15 years, you don't want to just take the same thing and repeat it. Also, [I had a desire to] go back to my entrepreneurial roots. Cisco will always be the best big company I worked for. And I decided I want to go back to ground zero again.

What does Arista bring to the data center that's unique?
The price/performance [$400 per 10G port] is always a huge advantage. But what drew me was their software architecture. I worked with four or five different operating systems in my time, and we all talk about modularity of the software, but that to me is just the tip of the iceberg. The real core of the software architecture is understanding what problem you're trying to solve and designing ground-up to solve it. The pain point in the data center is that much of the networking software is very monolithic. You can bring in a kernel like BSD or Linux, but that doesn't solve the problem. What is unique about [Arista's] EOS [Extensible Operation System] is separation of state from different processes. We have a transactional database where all of the state of networking variables is stored. Now you can do live patching, fault containment, live repair — real-time, in-service software upgrades. So, it's kernel, state and then the specific processes, like virtual LANs, Layer 3 routing, or switching or [control line interface]. . . . This is not something you can just pull out of Linux or classical, traditional software. The potential of EOS . . . all in a 1RU platform is just very compelling. [Google] has been our inspiration in developing products and platforms because they represent one of the largest and most scalable data centers.

Can Arista go it alone?
History would show you that there haven't been too many companies that have successfully built a stand-alone entity in the

See Ullal, page 26

Mixed

continued from page 1

and their platforms and dependencies.

The Big 4 management vendors — BMC Software, CA, HP and IBM — are handling the mixed-environment evolution by upgrading their monolithic platforms to manage Linux better as its use grows. In addition, a crop of next-tier vendors, start-ups and open source players are angling for a piece of the pie by providing tools that both work alone and plug into the dominant management frameworks.

"We are starting to see IT put more mission-critical applications on Linux, and from there you only start to see the stronger growth" of Linux, says Ute Albert, marketing manager of HP's Insight management platform. In January, HP will boost its Linux support with features HP already supports for Windows platforms, such as capacity planning, she says.

Use of Linux on mainframes has grown 72% in the past two years while x86 Linux growth hit 57%, the Enterprise Management Group analyst firm reports.

In the trenches, users are moving to suck the complexity out of their environments and make sense not only of individual network and systems components, but also of composite services, as well as find ways to aggregate data from multiple systems and feed results back to administrators and notification systems.

At Johns Hopkins University, managers are trying to reduce "console sprawl" in a management environment that stretches across 200 projects — many with their own IT support in some nine research and teaching divisions, as well as healthcare centers institutes, and affiliated entities.

Project leader pick their own applications and platforms with about 90% to 95% running Windows and 5% to 10% running Linux. There are storage-area networks, network devices, Oracle software, Red Hat, VMware, EMC, Cisco IronPort e-mail relays, and hardware from Dell, HP and IBM.

John Taylor, manager of the management and monitoring team, and Jamie Bakert, systems architect in the management and monitoring group, are responsible for 15,000 desktops and 1,500 servers, nearly 50% of the university's total environment.

"Our challenge is, we do not want to create another support structure," says Taylor, who has standardized on Microsoft's System Center management tools anchored by Operations Manager 2007 and Configuration Manager 2007.

Because Taylor doesn't control which systems get rolled out, he uses Quest Software's Management Xtensions for System Center to support non-Windows infrastructure. "Quest allows us to bring in anything with a heartbeat," Bakert says. That allows for managing distributed applications, which incorporate multiple components on multiple platforms. "Microsoft has a limited scope of what they are bringing into System Center," he says.

For instance, Bakert uses Quest Xtensions to monitor IronPort relays that work with Microsoft Exchange to make sure everything in the e-mail service is monitored in one tool.

The Quest tools also let Bakert store security events on non-Windows machines so he can report on both Windows and non-Windows platforms; that helps with collecting compliance data.

Taylor and Bakert also are beta-testing Microsoft's System Center Service Manager, slated to ship in early 2010, with hopes they can reduce the number of System Center consoles from five to one.

Eventually, Service Manager's configuration-management database will host data from Configuration Manager and Operations Manager, as well as incorporate the ITIL set of best practices for IT services management and the Microsoft Operations Framework.

Taylor and Bakert also are testing System Center's Virtual Machine Manager, slated to ship by year-end, which will manage Windows, the VMware hypervisor and Novell SUSE Linux guest environments.

Virtualization getting mixed management workout

Microsoft ironically had the title of first to support mixed hypervisor environments because it was last to release a hypervisor — Hyper-V. Without the benefit of the in-development Microsoft code, VMware, Novell, Red Hat, HP and others are playing catch-up on cross-platform management support.

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the disruptions.

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Mixed

continued from page 19

Novell is using its February 2008 acquisition of PlateSpin to support management across physical and virtual environments. The company's existing partnership and interoperability agreement with Microsoft has yielded virtualization bundles, and the company's acquisition of Managed Objects earlier this month will give IT administrators and business managers a unified view of how business services work across physical and virtual environments.

"In the data center we see that people are not saying consolidate [on a platform], they are saying give me a universal remote," says Richard Whitehead, Novell's director of product marketing for data center solutions.

Red Hat also is developing its portfolio. The stated goal of its February 2008 launch of the open source oVirt Project is to produce management products for mixed environments.

"The oVirt framework will be used to control guests in a cloud environment, create pools of resources, create images, deploy images, provision images and manage the life cycle of those," says Mike Ferris, director of product strategy for the management business unit at Red Hat.

HP has aligned its HP Insight Dynamics-Virtual Server Environment with VMware, and plans to add support for Microsoft's Hyper-V in the next release, according to HP's Albert. In addition, HP is increasing the feature set of its Linux management and monitoring support.

While the vendors work on their tools, the DMTF is working on standards it hopes will be as common as its CIM and WBEM standards.

The Virtualization Management Initiative (VMAN) released by the DMTF Sept. 16 is designed to provide interoperability and portability standards for virtual computing. The initiative includes the Open Virtualization Format for packaging and deploying one or more virtual machines to either Linux or Windows platforms. Tools based on VMAN will provide consistent deployment, management and monitoring, regardless of the hypervisor deployed.

"The truth is, we have been working on this whole platform-independence since 1998," says Winston Bumpus, president of the DMTF.

Virtualization is only one of the DMTF's initiatives. In the next month, the group will start its interoperability certification program around its Systems Management Architecture for Server Hardware (SMASH) and Desktop and Mobile Architecture for System Hardware (DASH) initiatives. SMASH, used to unify data-center management, includes the SMASH Server Management Command Line Protocol specification, which simplifies management of heterogeneous servers in the data center. DASH provides standards-based Web services management for desktop and mobile client systems.

Standards efforts are being complemented by open source vendors that are aligning their source-code flexibility with the interoperability trend.

Such start-ups as GroundWork, Likewise Software, Hyperic, OpenQRM, Zenoss and Quest's Big Brother platform are working the open source route to build a united management front. "We picked [tools] most people pick when they use open source, and we packaged them together," says Dave Lilly, CEO of GroundWork. The company's package includes 100 open source projects, including Nagios, Apache and NMap.

GroundWork also includes a plug-in it wrote to integrate Windows systems using Microsoft's native Windows Management Instrumentation. "We don't provide the entire tool set you may want, but we at least take the time and energy out of providing the monitoring infrastructure," Lilly says. Via standards, GroundWork can plug into other management tools, such as service-desk applications.

Other open source management resources include Open WS-Man, an XML Simple Object Access Protocol-based specification for management using Web-services standards. The project, which focuses on the management of Linux and Unix systems, is an open source implementation of WS-Management, an industry standard protocol managed by the DMTF. ■

Mixing management

Management is becoming more of an exercise in working among many environments, especially Windows and Linux. Here is a list of some standards, specifications, protocols and projects that users should be aware of as they look to bridge worlds.

Term	What it is	Why it matters
WS-Management	An XML-based SOAP management protocol for servers, devices and applications.	A common way to exchange or access management information.
Common Information Model (CIM)	A common definition of management information.	Systems can exchange rich management information.
Web-based Enterprise Management (WBEM)	A set of management and Internet-standard technologies; incorporates CIM and WS-Management.	Unifies management across a distributed network; provides for remote management of applications, application data-sharing and other procedures.
OpenPegasus	The Open Group's open source implementation of the DMTF's CIM and WBEM standards.	Creates bridges between open source and proprietary tools and platforms.
Windows Management Instrumentation	Infrastructure for management data and operations on a Windows-based operating system.	Automates admin tasks via scripts or applications; supplies management data to parts of the operating system and other Windows-based products.
Virtualization Management Initiative (VMAN) (in development)	A set of specifications that outline interoperability and portability standards for virtual computing.	VMAN's Open Virtualization Format is one specification that provides a standard format for packaging and describing virtual machines and applications.
oVirt (in development)	Red Hat project provides libvirt open source virtualization API and Web-based virtual-machine management console.	Supports only the KVM hypervisor today, but Xen support is in the works, and other patches can be added.
Systems Management Architecture for Server Hardware	Suite of specifications for managing in the data center.	Command Line Protocol specification enables management of heterogeneous servers.

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Verizon expands 10Gbps Ethernet offerings

BY BRAD REED

Verizon Business last week broadened its 10G Ethernet portfolio to include Ethernet Virtual Private Lines and Ethernet LAN services. Previously, Verizon had offered 10Gbps Ethernet services only on a customized basis through 10Gbps-capable Ethernet Private Lines and optical offerings. Now that the company has standardized its 10Gbps offerings, it will sell 10Gbps Ethernet LAN services and EVPLs to customers in 100 metropolitan markets.

EVPLs are data services that let customers connect their user network interfaces to multiple Ethernet virtual connections, unlike Ethernet Private Line services, which allow a single Ethernet virtual connection per UNI.

"10Gbps Ethernet hits the sweet spot for companies wanting to make the most of their IP networking capabilities for advanced applications that can be true bandwidth hogs," says Nancy Gofus, Verizon's senior vice president of global business products. "Now these applications can work harder and smarter across multiple locations across town."

10Gbps Ethernet is the fastest class of Ethernet service available commercially. Verizon says it has seen demand for higher-bandwidth Ethernet rise significantly in several industries, including healthcare, entertainment, finance and higher education. ■

Study: 10G, 40G Ethernet to grow at rapid clip

Enterprise ports of 10Gbps 'going through the roof', analyst says

BY BRAD REED

A troubled economy won't be enough to sink increased enterprise demand for high-bandwidth Ethernet services, says a new report from Infonetics Research.

The study says revenues for 10Gbps Ethernet services and equipment worldwide will hit nearly $9.5 billion by year-end (up 30% from $7.3 billion last year), and demand for 40Gbps Ethernet services will grow rapidly over the next four years, producing a projected compound annual growth rate of 59% as companies look to meet ever-higher demands for greater bandwidth capacity.

"A majority of service providers we've spoken to are expecting to invest in 40G until the 100G market is up and running," says Michael Howard, a co-founder and principal analyst at Infonetics. "Some providers are hoping to skip the 40G phase altogether, but we don't see that being a viable option, as growing traffic demands are outstripping current capacities and 100G won't reach reasonable price points until about 2012 or 2013."

"Increasing network capacity was named by network managers as their number one initiative," says Infonetics analyst Matthias Machowinski. "It's no surprise then, that shipments of 10G ports are going through the roof. Ethernet switch-based 10G port shipments, for example, grew 140% in 2007."

100G services will really start to take off in 2013, Howard says, although he expects them to debut on a limited basis sometime in 2009. Once 100G Ethernet does hit the market, though, he expects it will meet the demand for enterprise bandwidth for at least the next decade and will solve traffic problems "for a very long time." Late least year, Verizon became the first telecom carrier to test a native 100Gbps network. The company also has said it plans to start deploying a 100Gbps network over its major routes at the start of 2009. ■

BIG GROWTH

The total number of enterprise and ISP equipment ports that ship with capabilities of 10Gbps or higher will increase by more than sevenfold between 2007 and 2011, while revenue for 10G, 40G and 100G services will total roughly $20 billion by 2011.

SOURCE: INFONETICS

Could economy cause IT pros to crack?

BY DENISE DUBIE

IT professionals taking on more work in light of the current economic climate identified rising workloads as the greatest source of workplace stress, according to research from Robert Half Technology.

The IT staffing and consulting firm has released results of a poll of 1,400 CIOs that asked what stresses IT professionals most. More than one-third (36%) reported increasing workloads as the primary source of workplace worry. The pace of new technology followed, with 22%, and office politics taxed some 18% of respondents. The survey revealed that other stressors for IT professionals include work/life balance issues (11%) and commuting (7%).

"Too much work may sound like a relatively good problem to have in today's uncertain economic climate," says Katherine Spencer Lee, executive director of Robert Half Technology. "But overstressed IT workers are unlikely to perform their best. The pressure of mounting workloads, combined with ever-evolving technologies and office politics, can quickly erode morale and adversely affect productivity."

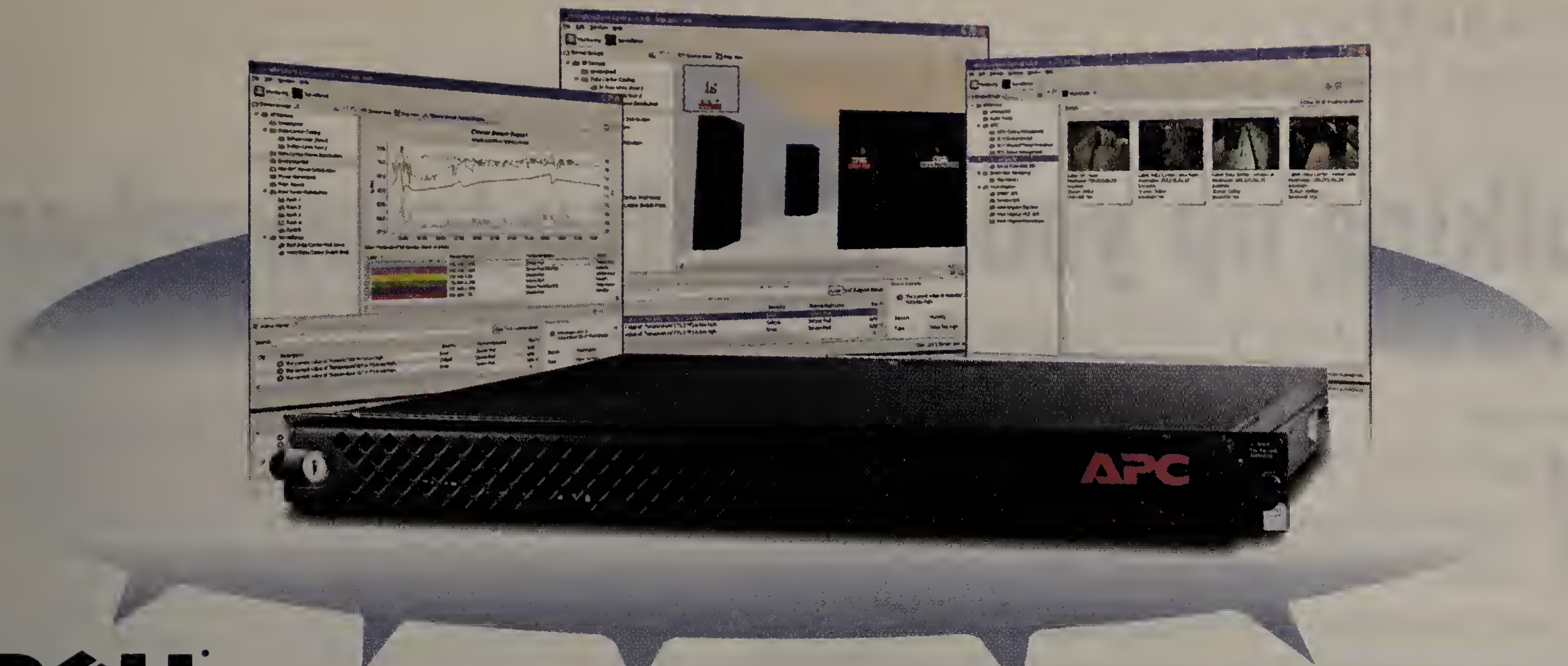
The survey results should not be shocking, considering the pace at which IT budgets are being cut and hiring plans frozen in response to recent economic turmoil. In June, for instance, the Society for Information Management polled more than 300 IT executives about their plans for IT spending in 2009, and in early October released results that showed 44% planned for bigger budgets and 43% intended to increase staffing. Three-quarters of those polled also expected to see IT staff salaries increase in 2009.

A more recent tally from the CIO Executive Board, however, revealed strikingly different spending plans. The late-September survey of some 50 CIOs by the association for IT executives showed that more than half of those polled have put nonessential projects on hold and about one-fourth have decided to freeze IT hiring. And 61% of those surveyed admitted they were re-evaluating their 2009 budgets.

John Turner, director of network and systems at Brandeis University in Waltham, Mass., said during an interview earlier this month that his IT budget has been directly affected by the current economic crisis. "Our operating expenditure budgets have been frozen and cut, and we currently have a hiring freeze in effect," he reported. "There is an obvious direct financial impact to our institution when there is this amount of uncertainty in the market."

Janco Associates in September declared that financial firms' woes would "glut the IT job market." According to Janco's estimates, more than 230 IT professionals at Lehman Brothers who make $250,000 or more a year will be out of a job by year-end.

IT professionals say they have seen workloads increase and job performance suffer. A recent discussion in *Network World's* online community showed that taking on more work could prove beneficial to some IT professionals, but others argue it could cause premature burnout. ■



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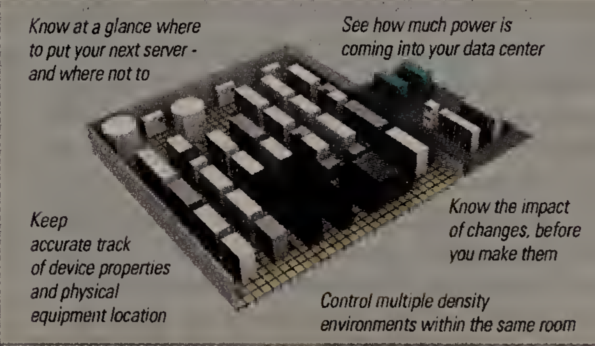
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Bulking up your WAN for teleworkers

Tips for adapting your corporate network for people working from home

BY BRAD REED

Whether they're in branch offices or home offices, workers are increasingly telecommuting instead of working in a traditional centralized office environment. For many companies, this trend presents many benefits as well as challenges. On the plus side, a recent survey shows that telecommuting increases worker productivity by allowing for more flexible working hours, and it saves companies money on reimbursing transportation costs and on office materials. On the down side, telecommuting can produce major security and privacy risks for companies that extend their WANs out to their employees' homes without giving them the knowledge or the tools to connect to the corporate network securely.

That means the big challenge for many companies is how to not only expand the reach of their WAN, but also keep it fast, secure and reliable. Here are five of the most important techniques, technologies and practices that companies can adopt to bolster their telecommuter WAN performance, and whether they should look outside their own in-house IT departments to meet some of these challenges.

1. Make sure your employees have strong home broadband connections.

This may seem obvious, but the first step to ensuring that your WAN can accommodate telecommuters is to ensure that their connections are up to speed for the corporate network. After all, security and software updates won't help anyone if the Internet pipe isn't strong enough to download them from the corporate network at a reasonable pace. This gets tricky, however, when telecommuters live in areas of the country that don't have access to fast cable or DSL services. In these cases, says Kelly Brown, the group manager for Internet and mobility services at Verizon Business, there is very little a company can do to upgrade a connection speed, and companies must look for ways to either upgrade the connection speed on the margins or upgrade to a stronger connection altogether.

One way to upgrade at the margins is to make sure that the PCs being used by the workers are fully optimized and have enough memory and hard drive space to fully take advantage of the Web connection they're working from, Brown says.

Eric Bozich, the vice president of product management for Qwest, says another option for companies looking to upgrade at the margins would be to invest in WAN acceleration technology that optimizes Internet routing and maximizes speeds for enterprise applications. He says one such product is Akamai's IP application accelerator that continuously scours the Web for the fastest and most reliable path to an origin server, much like a traffic helicopter that reports on which roads are clogged or open during rush hour. Other WAN acceleration vendors include Array Networks, Converged Access, Expand Networks, Juniper, Orbital Data, Packeteer, Riverbed Technology, Silver Peak Systems and Swan Labs.

But if WAN acceleration and PC optimization still don't get your connection where it needs to be, then you may want to consider upgrading your teleworkers' connection speeds.

Bozich notes that "5Mbps to 7Mbps services are available to most folks. If you can get that level of service, then that's enough bandwidth to do pretty much anything, including voice and low-resolution video solutions."

Of course, this becomes trickier in rural areas where dial-up services are the only landline options available. In these cases, says *Network World* columnist and small business consultant James Gaskin, companies should consider investing in satellite connections to broadband global-area network for "portable broadband" access to remote locations.

2. Be sure to have a wireless backup option.

Although wireline services are the most reliable and safe way to connect teleworkers to corporate WANs, even the best wireline networks go down from time to time. Thus, it's important for all employees working either at home or on the road to have access to a reliable wireless option that will safely give them access to corporate data. While in the past this has meant hooking on to unreliable and unsecure Wi-Fi networks, the advent of high-speed wireless technologies such as WiMAX, HSPA and EV-DO gives teleworkers the option of connecting to networks that offer good data speeds over a wide area.

Brown says that when she's working at the office, for instance, she has the EV-DO card on her laptop in place as a backup so that she can connect to Verizon's 3G network in case her wireline service goes down. While relying upon 3G cellular networks for data services can be more expensive than traditional wireline services, they provide reliable and secure backup connections, Brown says.

Bozich also fires up the EV-DO wireless card on his laptop when he's on the road and doesn't have access to Wi-Fi, and he thinks that WiMAX will also play a bigger role in keeping teleworkers connected to corporate WANs in the coming years.

"WiMAX should ultimately become an extension of Wi-Fi once it becomes more widely deployed," he says. "I don't see it as an either-or proposition. They can work in concert together."

3. Understand that security goes beyond the VPN.

VPNs have become a staple tool for teleworkers looking to connect to corporate data. But there are severe limitations on what VPNs can do that make it hazardous to rely on as a sole security measure, Bozich warns.

"The VPN creates a secure point-to-point connection where data isn't susceptible to being intercepted," he says. "But it doesn't address issues of whether there is a virus on your machine. Obviously, having a VPN is better than not having a VPN, but you should understand that it doesn't allow IT administrators to form a comprehensive set of policies around it."

Installing firewalls and antivirus software are the most obvious additions to having a VPN connection, Brown says. Another option, she says, is to access corporate data directly through a protected Web site that is configured SSL, which enables encryption of sensitive data over the Web.

"If you want to have enterprise data that can be accessed through the Web, you need to ensure that it's going through a secure site, and that's where you're getting into the SSL environment," she says. "You can go to a particular Web site, you log in, and it will establish an SSL connection, and just like an IPSec type of pipe, it would add the layer of security that you'd

See Telecommuting, page 48

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Apple, AT&T rescued by iPhone

Big profits spark big competition for device sales, third-party applications

BY BRAD REED

Anyone wondering why there have been so many smartphones in the news lately need only look at the quarterly profits reported last week by AT&T and Apple.

In its earnings report for the third quarter, AT&T reposted revenues of $31.3 billion, an increase of more than $1 billion compared with the third quarter of 2007, and a net income of $3.23 billion, compared with the $3.06 billion the carrier reported in 2007. Apple posted revenues of $7.9 million, up from $6.2 billion in 2007, and a net income of $1.1 billion, up from $904 million in the third quarter of 2007.

The common thread running through both companies' good fortunes is the iPhone, which for the first time sold more units than Research in Motion's BlackBerry device over a three-month span. In total, Apple sold 6.9 million iPhones in the third quarter of 2008, compared with 6.1 million BlackBerries sold over the same period in 2007.

Apple CEO Steve Jobs says that iPhone sales accounted for 39% of the company's total revenues in the third quarter, and that the company had also sold roughly 200 million iPhone applications from its online AppStore in its three-plus months of existence.

AT&T, meanwhile, says the iPhone 3G helped the company pick up nearly 1 million new customers in the third quarter, thus helping drive wireless net income up to $2.3 billion, an increase of more than 20% from 2007.

With the iPhone driving profit growth at both AT&T and Apple, many telcos and tech companies have been working overtime to develop popular smartphones of their own. The most hyped new smartphone to officially hit the market last week was T-Mobile's G1, the first commercially available device to run on Google's Android open source mobile platform.

The device, which was developed by HTC, has generated buzz in recent weeks because of its Linux-based open source mobile platform that Google first debuted last November. Google has long said that the goal of the platform would be to spur innovation within the mobile development community and also to give users the ability to switch carriers without switching their mobile devices.

Last week, Google also released Android's source code so third-party developers can experiment with and improve upon the mobile platform.

As Andy Rubin, Google's senior director of mobile platforms, put it, "An open-sourced mobile platform, that's constantly being improved upon by the community and is available for everyone to use, speeds innovation."

Not to be outdone in the open source mobile platform arena, Nokia began aggressively courting developers last week by talking about its plans to open up its Symbian mobile platform to unlicensed third-party development in order to keep pace with Android in attracting software developers.

Although the company stands to lose an estimated $300 million annually in licensing revenues by opening up its platform, Symbian CEO Nigel Clifford says it had no choice if it wanted to stay competitive.

"Up until now maybe developers have been little bit put off by licensing arrangements, by terms and conditions and that is one of the principal changes with the Symbian Foundation," he says.

Nokia first announced its intentions to open up the mobile platform when it officially purchased Symbian and banded together several major mobile phone and electronics manufacturers to create a single open mobile software platform standard based on the Symbian operating system.

Unlike Google and Symbian, RIM has not opened up its BlackBerry operating system to unlicensed third-party development. But like those two companies, RIM is talking to applications developers in an effort to entice them to develop more third-party applications for BlackBerry devices. RIM promised developers last week that it would give them tools to build Web applications that work offline and would also expand beyond the Java platform that has been the staple platform for BlackBerry application development.

Among other things, BlackBerry will now support the Gears Web application framework, an open source set of JavaScript APIs that lets developers build offline Web applications. The company also says it will open its own BlackBerry Application Storefront in March, where developers can sell their applications directly to customers.

But despite the fact that RIM is trying to expand its appeal beyond the enterprise and more toward consumers, the company insists that it is not losing sight of the strong security features that have made the BlackBerry a hit with enterprise users. ■

Ullal

continued from page 18

last decade. I hope we can be a unique differentiation from history because of the innovation. We have over 1,000 man-years of networking expertise in the company, even though we're less than 50 people. The customers are looking for a specific solution for a specific vertical application. We're not trying to be the switch for all seasons, like I did at Cisco. We're trying to be focused on very specific applications for high-performance compute, Web, content delivery and vertical applications that really require cloud networking features ... besides price/performance. Customers can use us as a complement to their existing Cisco infrastructure.

Do you plan to come out with a chassis-based core switch?

We definitely have a road map that goes beyond the 1RU. We feel, though, that the ability to pack 48 ports into such a form factor [is unique] compared to a lot of the modular platforms. In theory, if you rack up 1RUs, you can get 2,000 ports of 10 Gig E. There aren't a lot of modular systems today that can give you 2,000 ports — more like 200 ports. If we had done modular, it would be challenging, because in most environments we coexist with [Cisco] Catalyst 6500 or Nexus 7000 [switches] or a Juniper MX960.

Is the switch stackable right now, or is that on the road map?

No. We don't preclude it, but we don't have stackable software right now. People would like, over time, to see us have 40G and 100G between the switches as uplinks. At some point, Intel will put [10G] on their motherboard. When they do that, the curve changes completely because right now our switch port is cheaper than a host adapter. But as soon as that gets closer to $100 to $200, then you have the same phenomenon expressed in 1 Gigabit Ethernet — a smooth, cost-effective transition to 10G. We expect that's going to happen in Q2 or mid-2009.

Will that take you into business workgroups and wiring closets?

When you're a start-up, it's very important to focus on what you do, but equally important is what you don't do. I will leave the traditional enterprise campus and wiring closet to Cisco. We want to focus and be inspired by the requirements in the data center, and especially as it relates to this new trend of hosting clouds.

Where is Cisco most vulnerable or challenged in the data center?

The challenge of anything in the data center is always product transitions. Cisco has a very large focus with the Catalyst, and now they have the Nexus. Positioning and appropriately deploying and achieving the right price/performance and functionality and design is a delicate task. ■

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White space and the FCC: a chance to do right

NET INSIDER
Scott Bradner

One of the few unqualified success stories in recent U.S. spectrum policy has been the unlicensed spectrum used by devices ranging from car door openers to Wi-Fi. If the current schedule holds, the FCC may vote on Nov. 4 (Election Day) to expand this spectrum considerably. Such a vote might upset traditional broadcasters but would clearly be a big win for most of the population.

The spectrum in question is the unused "white space" between licensed broadcast channels, and if the FCC enables its unlicensed use it will be with major restrictions. But even with those restrictions, we could be on the brink of a major expansion of useful technology.

As is too often the case, the arguments against changes in spectrum licensing policy have been distorted by hyperbole. For example, David Donovan, head of the Association for Maximum Service Television, which appears to be a TV industry lobbying group, was quoted by the Broadcast and Cable Web site as saying the FCC proposal will "decimate over-the-air TV." My dictionary defines decimate as "kill, destroy, or remove a large percentage of." I doubt that the FCC would permit this to happen and its report on testing of sample devices does not show that the death of broadcast TV is in the offing.

Donovan is not the first person to overstate his case in spectrum policy discussions (see "What are they so worried about?", www.nwdocfinder.com/7222) and he is not likely to be the last. But the discussions would be a lot more productive if some modicum of reality were the norm rather than the exception.

Restrictions proposed by the FCC include limiting devices using this spectrum to low transmitter power, requiring that they be able to figure out where they are and, based on that information, look up in a database what channels are unused in that area before deciding what frequency to use. While these restrictions are a reasonable stopgap approach, a far more flexible approach is that taken by cognitive radio and examined in the FCC tests. A cognitive radio listens to the world around it to determine what frequencies are unused and then communicates on them. The FCC tests indicated a lot of promise for such approaches but also showed that they are not yet ready for prime time.

The FCC proposal opens up some additional unlicensed spectrum, but its benefits are nowhere near what a general cognitive radio approach would yield. Most of the allocated spectrum is unused most of the time.

An aggressive cognitive radio approach could open up all of this spectrum for alternative use.

If history is any guide, permitting the same type of essentially unlimited use by approved devices — which has been the case with the current unlicensed spectrum — would be a huge, but largely unpredictable, boon to technology development. The existing unlicensed spectrum supports a much wider range of devices than was expected in 1985 when the experiment started.

I have not been all that nice to the FCC in this column, with good reason, but this is a case where they just might make a next step along a path that could lead to a far better use of spectrum, and to a new explosion of technology development.

Disclaimer: I know of no stated Harvard opinions on the FCC and its ability to not get things right, so the above hope is mine alone.

Bradner is Harvard University's technology security officer. He can be reached at sob@sobco.com.

Are young workers really all that different?

EYE ON THE CARRIERS
Johna Till Johnson

Are young workers today fundamentally different? It's trendy these days to describe the so-called "millennial" generation — those born between 1989 and 2000 — as somehow fundamentally different, especially in their almost instinctive use of technology.

Between MySpace, Twitter, cell phones and the ubiquity of the Internet, these kids have never known what it's like to be disconnected. They multitask all the time. And they really care what their friends think.

All this makes them fundamentally different, or so the theory goes. Tech pundits have made careers advising us that this generation's unique characteristics represent a fundamental shift in human society — possibly even the start of the singularity. (For those who aren't aware, "the singularity" is a theory — created by the science-fiction writer Vernor Vinge and popularized by Ray Kurzweil — that posits that at some point, technology's rate of change will accelerate so quickly that the fundamental nature of humanity will change.) Business managers in general — and IT in particular — will have to adapt to enable this "new breed" of human to reach its fullest potential.

Pardon me while I retch. As a charter member of the so-called Generation X — the generation born between the Baby Boomers and the Millennials — I'll admit to a deep skepticism about generational explanations of anything. (Skepticism, of course, is the defining trait of us Gen Xers.) And while I find the notion of a singularity intriguing — even possible — I don't see much evidence that we've reached it quite yet.

As far as I'm concerned, people at certain stages of their lives tend to behave similarly — and have since, oh, the time of Alexander the Great. People in their 20s tend to be ambitious and idealistic, and have lives centered on their friends. They love communicating and are enchanted by new ideas. They can be scatterbrained and disorganized, but they're quick to embrace new technology and generate a disproportionate share of the innovative ideas. (Reread James Boswell's *Life of Samuel Johnson* if you don't believe me — and the period it describes is the mid-1700s.)

In sum, I don't buy that the Millennials are different — or rather, I do, but only in the sense that every new generation brings a wave of innovation that previous generations can learn from and leverage.

Every new generation brings a wave of innovation that previous generations can learn from and leverage.

So, IT practitioners who are thinking about how to revamp the workspace to accommodate this "new" generation shouldn't get too wrapped around the axle about the much-vaunted "differentness" of the Millennials. Instead, we'd do well to look at the ways current and upcoming technologies can make business processes more effective — not just for folks in their 20s, but for workers of all ages.

Some hints? Deploy collaboration as a strategic advantage. Throw smart people together in communities, give them effective tools for collaboration, and let them work out the details collectively. Then field-test outcomes against reality. Do it right, and you'll get great results from all employees — not just the "unique" Millennials.

Johnson is president and senior founding partner at Nemertes Research, an independent technology research firm. She can be reached at johna@nemertes.com.

Novell, Sun, Oracle crank out ID mgmt.

Compliance, strong authentication focus of latest security software

BY JOHN FONTANA

Novell, Sun and Oracle last week announced updates to their identity-management platforms that focus on monitoring access controls and strengthening authentication.

Novell and Sun both unveiled tools for compliance, while Oracle added features to its strong authentication platform. The trio made their announcements at the annual European version of the Burton Group Catalyst Conference, which opened in Prague.

Novell released its Access Governance Suite, a bundle of two products it is licensing from roles-management vendor Aveksa. The tools let users define and manage access rights and streamline them into the identity- and access-management workflow, including role provisioning in Novell Identity Manager. Novell is integrating the bundle with its Sentinel software, which provides real-time event correlation. The Aveksa products in the bundle are branded Novell Compliance Certification Manager and Novell Roles Lifecycle Manager.

"We now have a closed-loop process," says Nick Nikols, vice president of product management for identity and security at Novell. "Now we can manage and initially set appropriate access settings, but also monitor their usage and refine them over time." The Aveksa technology provides an easy way to bring new applications into the provisioning process, he says.

Perhaps more important, however, is that the Aveksa technology lets IT share the responsibility for role creation and management with managers throughout a company's business units. The tools collect a user's access data from across the network and aggregate it in one location. In addition, review of the data can be automated, as can certification, reporting and change management.

Sun's watchdog

Sun 's new Identity Compliance Manager is a tool for automating the collection of access data and for reporting on compliance. The tool also has a watchdog role, allowing users to monitor changes in user access and take corrective action if needed.

The base technology in Compliance Manager was acquired when Sun bought Vaau, and is the same technology Sun used as the foundation for Sun Roles manager.

"Not every customer is ready for Roles," says Nick Crown, senior product line manager. "This provides a lower price point and sets them up for the future."

Compliance Manager includes a number of new features including access certification, which captures and consolidates identity and access data and provides an audit trail. Users also can set Compliance Manager to validate access controls based on an event, such as a job transfer entered into a human-resources system. Other features include the Entitlement Glossary, which uses plain English to describe access privileges; a segregation of duty features; and remediation tracking.

Sun Compliance Manager costs $75,000 plus a charge per user based on volume.

Oracle released Adaptive Access Manager 10g Release 3, which is designed to protect against fraud, identity theft, phishing and keylogging. Earlier this year, the vendor updated its compliance and auditing tools.

Highlighting Release 3 are four new features: auto learning, which detects a user's normal working patterns, then watches for anomalies that might indicate fraudulent use; investigation management, which provides advanced service-log reviews and analysis; transaction administration for examining and analyzing the technologies used in transactions; and support for 20 languages. Oracle also has embedded a copy of Oracle Business Intelligence Publisher in the software. ■

SECURITY

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IBM launches hosted Notes

BY JOHN FONTANA

IBM last week said its Lotus Notes Hosted Messaging service is available and while it is focused on e-mail only, the company plans to roll out other services over time including instant messaging.

IBM's hosted-messaging comes just more than a year after rival Microsoft launched the hosted version of Exchange into beta, where it remains. IBM's service is live, however, while Microsoft is expected to take its service live by year-end, according to Kevin Cavanaugh, vice president of messaging and collaboration software for IBM.

Microsoft's Exchange Online is a vanilla offering of Exchange, but Microsoft partners plan to build other services around it. Exchange Online targets companies with 5,000 users or more and costs $10 per user, per year.

IBM already offers its Sametime Unyte Webconferencing service and just released a beta of Bluehouse, a collection of collaboration services available over the Web.

Lotus Notes Hosted Messaging will start at $10 per user, per year for 1,000 users, Cavanaugh says.

IBM will have two models, the first catering to users who already have Notes and Domino licenses, Cavanaugh says. In that model, IBM will sell Lotus Notes Hosted Messaging and let users apply their licenses to the service. In the second model, "if you don't have the licensees, we will sell you those and the services," he says.

IBM believes users who have not moved to Lotus Notes 8 already could evaluate hosted Notes as an alternative to upgrading software and/or hardware as they move off the 6.5 and 7.0 versions of Notes, Cavanaugh says. He adds that IBM will custom-build for users with existing Domino application infrastructures who want to move their Notes messaging into a service. "We have yet to figure out some standard way to sell them the app since users' apps differ so much," he says.

The service will offer two back-end options: a single Domino server or a cluster. Each option is defined by differing service-level agreements and availability levels. IBM is hosting the Notes service within its own data centers.

IBM has a number of partners that host Notes environments for users, including Blue Sky Hosting, Domino Developer Network and Prominic.Net.

IBM has never had a formal hosting service around Notes/Domino for customers. What have been offered are one-off, highly customized environments. This new service will be opened to a mass audience.

In other news, IBM said Hyatt Corp. would standardize on Notes, Domino and Sametime for unified communications and collaboration across its global business. Domestic hotels will roll out Notes this year, and international properties will deploy in 2009. ■

HD video conferencing to the desktop

BY ROGER WALLMAN

Desktop videoconferencing is moving into the mainstream as companies look for ways to save money, reduce their carbon footprint and better use their workforce. At the same time, many organizations are investing in high-definition, room-based videoconferencing systems, a move that raises questions about how to extend HD support to the desktop. Do you have high-quality Web cameras? What are the PC requirements? How about the bandwidth demands?

Obviously high-definition requires cameras that can support high resolution, but it is more complicated than that. The main resolution number manufacturers use to market their products is for cameras in still or photographic mode, not in motion or video mode. In general, as video resolution goes up, the frame rate drops dramatically. You should look for high resolution, such as 960x720 or 1280x720, along with a frame rate approaching 15 to 30 frames per second (fps).

Additionally, a glass lens is preferable to a plastic one because it minimizes distortion and will provide more image detail and clarity. Lens quality is significantly more important with HD video than with standard-definition because the goal is to have the highest-quality source image with the least number of optical artifacts so the video codecs won't waste cycles encoding and decoding irrelevant pixels.

Desktop video probably will be used at home and on the road where the lighting is typically not as good as it is in an office setting, so the camera's gain control should be able to increase image brightness and remove shadows from a face without overexposing the image. Another important feature is autofocus because desktop users tend to move around in front of their PCs and many cameras' focus is accurate only in a limited range, especially in situations with less than optimal lighting.

Core infrastructure requirements

In terms of PC support, H.264 is the video codec that most standards-based conferencing endpoints support. Before HD the typical resolution for desktop videoconferencing was either Quarter Common Intermediate Format (QCIF, 176 x 144) or CIF (352 x 288), with some applications also supporting a second video stream of presentation data. A single-processor system (2.0GHz CPU) could support this level of video quality for both send and receive. HD 720p (1280 x 720) is roughly nine times more resource intensive than CIF — there is simply nine times more data to encode and decode.

With these increased processing requirements you need at least a dual-core CPU (2.0GHz). One core encodes the video and the other decodes, leaving enough CPU to process audio and perform other PC tasks. A typical dual-core system will have enough horsepower for receiving HD at 30 fps, but not quite enough to encode or send HD video at 30 fps. Most dual-core systems will top out at 15 to 30 fps. Achieving 30 fps of encoded HD video requires a quad-core machine — two cores for encoding, splitting the workload in half, and one core for decoding.

Although it is not necessary to have the most advanced processor in your PCs, to achieve the highest level of performance vendors will optimize their code using the advanced instruction sets offered on the latest-generation processors as a standard development practice. In terms of memory, 2GB should be sufficient for most applications.

On the bandwidth side, most videoconferencing endpoint vendors recommend 1.5Mbps for HD video. In practical use, HD requires a minimum of 768Kbps for very good quality, which becomes excellent quality at 1.5Mbps. In comparison, H.264 CIF video provides very good quality at 256K to 384Kbps. The difference is the amount of information with the higher-resolution HD stream.

Although HD video to the desktop doesn't require anything new for audio devices, it's still helpful to review the best practices in this area. Many PCs and Webcams have integrated microphones, which are usually not recommended because they tend to be of poor quality, pick up background noise and keyboard use, and don't have echo cancellation. However, some new notebooks and Webcams have built-in array microphones, echo-cancellation and noise-reduction. These are new to the market, so you should test their performance with your specific conferencing application.

Experience has shown that you can't go wrong with either a headset or one of the commonly available USB combination speaker-microphone devices. The inherent design of a headset eliminates echo, and the USB devices have built-in hardware echo cancellation. The most common problem observed with audio devices is the selection of the wrong microphone for recording and speaker for playback in the conferencing application.

HD desktop videoconferencing requirements

Web camera

- High resolution: 960x720 or 1280x720
- 15 to 30 frames per second
- Glass lens
- Auto gain control
- Autofocus

Network bandwidth

- 1.5Mbps recommended
- Minimum 768Kbps

PC specifications

- Dual-core CPU (2GHz) for 15 fps
- Quad-core CPU (2GHz) for as many as 30 fps
- 2GB memory

Audio devices

- Headset or USB microphone or speakerphone with echo cancellation

When external audio devices are connected to a PC, Windows detects multiple devices and the conferencing application doesn't necessarily choose the correct one. This problem is apparent with USB devices with integrated echo cancellation. If the same device is not selected for recording and playback, echo cancellation doesn't work as well on some applications because it doesn't know which audio is correct and which is echo.

These are general guidelines, and you should verify the requirements of your specific conferencing application. The quality that HD brings ushers in the potential for new levels of acceptance and productivity for desktop videoconferencing. If you have not experienced one of the new applications, HD deserves a try.

Wallman is director of product marketing at Radivision (www.radvision.com).

This vendor-written tech primer has been edited by Network World to eliminate product promotion, but readers should note it will likely favor the submitter's approach.

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GEARHEAD

Mark Gibbs

Is your cell number causing signal issues?

Last week I bemoaned the fact that my T-Mobile cellular service had become so poor I resorted to a high-gain aftermarket antenna to grab a signal.

Reader John Constantine feels my pain: "I suffered with T-Mobile and the Razr they sold me for years. Our home is in a small valley between two towers. We had such poor reception that my friends at Spotwave Wireless sent me a commercial-grade repeater that couldn't get enough signal to work at home! My wife still suffers poor signal in her home office, but can take the call if she walks outside … and T-Mobile says its coverage is good to excellent. I suffer no longer; won an iPhone and had to switch to AT&T."

I used to have AT&T but they annoyed me so much I switched to T-Mobile. My contract runs out in December. Hey, AT&T. Want another customer?

Reader Thomas Tetter also feels my pain: "I've experienced something that sounds similar to your cell reception issue. Two years ago, I suddenly lost all cell reception in my office at work. I could drive half a mile away from my office in any direction and suddenly get full service again. I had had perfect service for four years prior to this situation."

Tetter is an Alltel customer or, as he put it "… a Verizon or whoever-owns-Alltel-this-week customer." Tetter started with Tier-one techies and, "not surprisingly that yielded no results. I have yet to find the Tier one of any large service provider to be worth the space they occupy, even when you consider that the universe is infinite."

Alltel loaned Tetter a refurbished phone, a different make and model from the original phone, but that didn't help. He could travel a half mile in any direction and get a good signal but "heading back to my office yielded no service and a lot of customer angst."

Tetter then managed to do the near impossible: He caused a big enough commotion that Alltel actually assigned a field engineer to his case! For once the mountain came to Mohammad.

The field engineer set up Tetter's number on his diagnostic phone and, miracle of miracles, the engineer's phone was now no better than Tetter's. At this point choirs of angels burst into song, the light of truth bathed the scene in glory and the engineer joined up the dots.

He explains: "Your phone number is used in the algorithm that establishes communication … with the tower. What's not obvious is that in some cases, the quality of the signal you receive is not so much dependent upon the closest tower, but which receiver on that tower communicates with your phone. Alltel had recently upgraded all the receiving antennas in the closest tower to my office. When they did that, one of those three receivers (which was the receiver pointed towards my office) had a firmware incompatibility with an older network card in the tower."

"This older network card was responsible for communication with phones in [my number] range … and since it was an older range of numbers that Alltel had phased out in my area, I was the only person experiencing that problem. Once they resolved the firmware issue with the offending receiver, my original cell phone with my cell phone number programmed back into it, returned to full service."

Tetter concludes from this that that your phone number alone can be a determining factor in how good your cell reception is.

So, a question for all of you IT folk who have to deal with your enterprise cell phone services: Have you seen these kinds of problems? Could this be the answer to life, the universe and everything cellular that doesn't work?

Don't call Gibbs in Ventura, Calif., because he still has no bars most of the time. Try smoke signals to gearhead@gibbs.com.

COOLTOOLS

Two more handy iPod/iPhone add-ons

Who says gadgets have to be expensive? Here are two simple and effective iPhone/audio accessories that will enhance your ownership of portable audio devices.

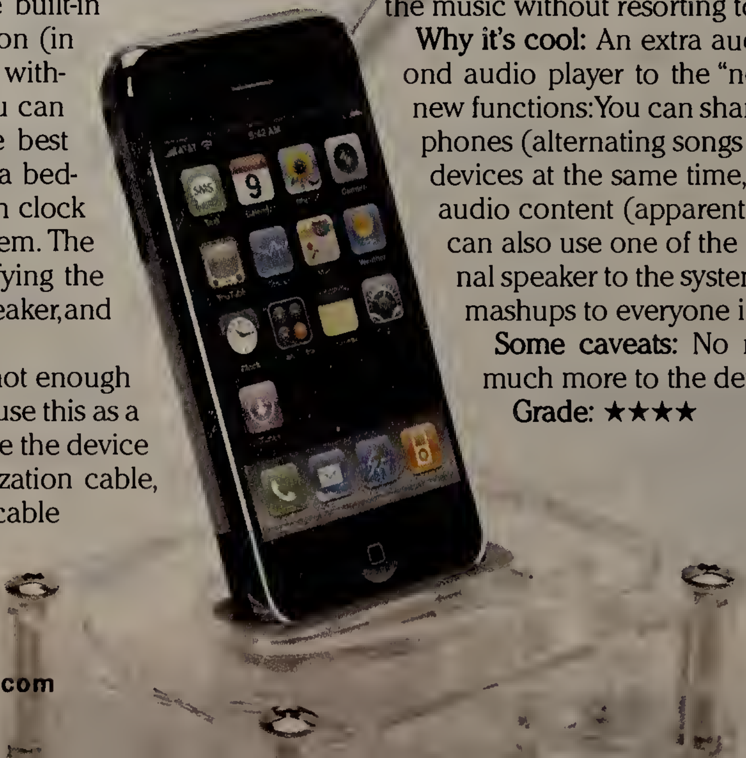
The scoop: AirCurve, by Griffin Technology, about $20.

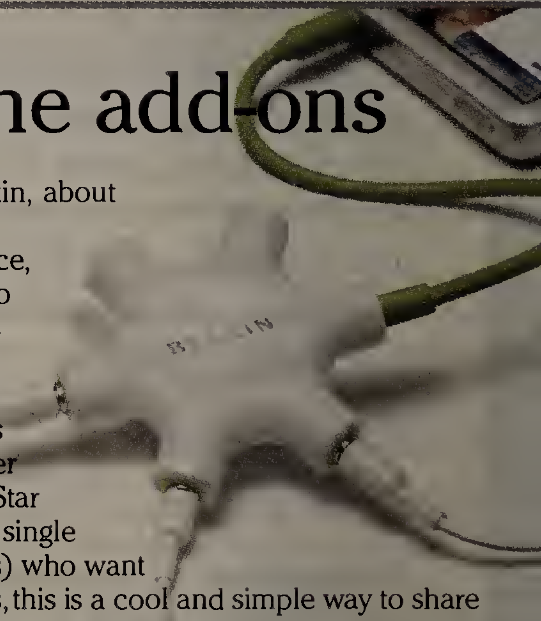
What it is: About the size of a small brick, the AirCurve block is made of translucent polycarbonate (Griffin's fancy word for plastic), and includes dock connectors for attaching an iPhone or iPhone 3G model. Using a "coiled waveguide" within the base, the AirCurve can magnify the sound from the iPhone's built-in speaker, delivering as much as 10 decibels of amplification.

Why it's cool: iPhone owners know that the built-in speakers don't provide much audio amplification (in other words, they stink). The AirCurve amplifies without requiring a powered speaker source, so you can get the audio effects of a speaker system. The best usage for the device would be in an office, or a bedroom if you want to use the iPhone as an alarm clock without having to buy a separate speaker system. The device succeeds in its stated mission of amplifying the iPhone's speaker without needing a powered speaker, and the price seems right for that task.

Some caveats: The amplification is probably not enough for noisier environments (you wouldn't want to use this as a speaker at a party, for example). In addition, while the device includes space to attach a charging/synchronization cable, there were no instructions on how to snake the cable through to allow for this option.

Grade: ★★★★ (out of five).





The scoop: RockStar, by Belkin, about $20.

What it is: A star-shaped device, the RockStar includes five audio input jacks for headphones, as well as one input jack to connect to an iPod, iPhone or other audio device. With headphones connected to any of the other prongs on the device, the RockStar lets multiple users listen to the single iPod device. For kids (or spouses) who want to share their iPods with others, this is a cool and simple way to share the music without resorting to a speaker system.

Why it's cool: An extra audio jack cable lets you connect a second audio player to the "network", which then provides for two new functions: You can share two devices among four other headphones (alternating songs if you so desire), or you can play both devices at the same time, creating some on-the-fly "mashups" of audio content (apparently, all the cool kids are doing this). You can also use one of the headphone jacks to connect an external speaker to the system, which would let you broadcast your mashups to everyone in the room if you wanted.

Some caveats: No real negatives, other than there's not much more to the device than the headphone extension.

Grade: ★★★★

Shaw can be reached at kshaw@nww.com. Check out Cool Tools videos and Twisted Pair podcasts at www.networkworld.com.

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CLEAR CHOICE TEST WLAN ACCESS POINTS

802.11n gear 10 times faster than current Wi-Fi offerings

Throughput tops 250Mbps in groundbreaking test; BlueSocket wins

BY DAVID NEWMAN, NETWORK WORLD TEST ALLIANCE

Testing 802.11n wireless-LAN gear for enterprises means thinking big.

With the latest version of Wi-Fi promising vastly higher data rates compared with previous incarnations, testing it with a couple of laptops running a few FTP sessions through a single access point won't do.

Instead, *Network World* set up the largest public 802.11n test ever conducted. We invited all enterprise Wi-Fi vendors to supply not one but eight 802.11n access points, along with controllers if needed. Working with test instrument vendor VeriWave, we crafted test traffic from hundreds (in some cases, thousands) of virtual clients to see how high the new 802.11n systems would scale, in pure 802.11n settings and with a mix of 802.11n and legacy clients. In all these tests, the goal was to determine 802.11n performance in an enterprise context.

Four vendors took us up on the challenge: Aerohive Networks, Bluesocket, Motorola and Siemens. Some big names declined to take part, leaving us to wonder how ready their 802.11n offerings actually are (see "Big players missing in action," page 42). We stand at the ready to test these products against our existing methodology, should they decide to place their gear in a public test.

The vendors that did participate proved the adage that 90% of life is about showing up. Multiple vendors cracked the 2Gbps mark in pure 802.11n throughput tests, pushing data rates of 250Mbps or more per access point. That's around a 10-fold improvement in throughput over existing 802.11g and 802.11a access points — a compelling case for considering 802.11n as an alternative to wired connectivity in the enterprise.

Power is a big concern with the new systems, especially because some may need more juice than standards-based, power-over-Ethernet (PoE) switches can supply. Some systems stayed within the limits of current PoE specs, while others may require upgrades to larger power supplies.

The new systems showed rough spots in a few places. We couldn't complete throughput tests in some cases because access points became unresponsive or even rebooted. That's interesting given that all systems tested are built around the same Atheros Communications radio module. The very different results speak to the different optimizations each vendor has done in working with the Atheros radios.

Bluesocket's BlueSecure AP-1800 access points offer the best combination of performance, power efficiency and features. Bluesocket's sys-

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NETRESULTS

Product	**BlueSecure AP-1800; BSC-2200 controller**	**HiPath Wireless AP-3620; HiPath C2400 controller**	**Aerohive HiveAP 340; Aerohive Manager**	**AP-7131 Tri Radio 802.11n Adaptive Access Point**
Vendor	Bluesocket www.bluesocket.com	Siemens www.enterprise-communications.siemens.com	Aerohive Networks www.aerohive.com	Motorola www.motorola.com/us/products.jsp
Price	$23,400	$35,800	$15,000	$10,000
Pros	Good overall performer; relatively efficient power usage; most robust system tested.	Most efficient at power consumption; good overall performer.	Strong performer with highest 802.11n throughput; no controller needed; good security features.	Novel design will accommodate as many as three radios, including forthcoming WiMAX module.
Cons	Significantly slower with bidirectional compared with unidirectional traffic.	Software glitches created hangs or reboots in a few stress tests.	High latency in some tests; high power consumption.	Software glitches prevented completion of some tests; relatively high power consumption.
Score	4.05	3.70	3.65	2.85

*Includes eight 802.11n access points, each with 2.4- and 5GHz radios, and controller if needed

SCORECARD

Action	**Weight**	**Bluesocket**	**Siemens**	**Aerohive**	**Motorola**
802.11n performance	20%	4	2.75	4.75	2.5
Mixed-mode performance	20%	3.75	2.75	3	2.5
WiMix performance	20%	4	4	4	2.5
Power efficiency	20%	4.5	5	2.5	2.75
Features	20%	4	4	4	4
Total score		4.05	3.70	3.65	2.85

Scoring key: 5: Exceptional; **4:** Very good; **3:** Average; **2:** Below average; **1:** Subpar or not available.

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802.11n throughput

In this test, we sought to answer the primary question in assessing 802.11n performance: How fast will it go? To find out, we associated 20 802.11n clients to each of eight access points and offered traffic downstream (the most common direction for enterprise WLANs), upstream and bidirectionally.

MEASURED ACROSS EIGHT ACCESS POINTS, EACH WITH ONE 5GHZ RADIO ACTIVE

Direction	88-byte frames (Mbps)	512-byte frames (Mbps)	1518-byte frames (Mbps)	88-byte frames (fps)	512-byte frames (fps)	1518-byte frames (fps)
Aerohive downstream	**260.8**	**1,463.2**	1,948.4	**370,432**	**357,237**	160,440
Bluesocket downstream	176.1	1,023.0	1,937.1	250,085	249,766	159,511
Motorola downstream	156.8	911.4	1,893.9	222,714	222,513	155,941
Siemens downstream	227.4	1,297.4	**2,070.9**	322,983	316,751	**170,525**
Aerohive upstream	**460.1**	**1,871.2**	**2,109.7**	**653,585**	**456,841**	**173,725**
Bluesocket upstream	227.6	1,313.5	2,005.5	323,330	320,669	165,144
Motorola upstream	No valid result	1,055.2	2,050.2	No valid result	257,625	168,826
Siemens upstream	No valid result	No valid result	2,042.2	No valid result	No valid result	168,162
Aerohive bidirectionally	**112.7**	**904.5**	**1,550.3**	**160,149**	**220,831**	**127,663**
Bluesocket bidirectionally	74.7	314.8	682.5	106,121	76,857	56,197
Motorola bidirectionally	No valid result	387.1	883.2	No valid result	94,511	72,726
Siemens bidirectionally	No valid result	No valid result	583.1	No valid result	No valid result	48,014

"No valid result" indicate hardware or software issues with the system under test prevented us from obtaining a valid measurement for this test case.

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tem wasn't the fastest we tested, but it exhibited consistently low latency and jitter, and it didn't suffer from some of the software bugs that hampered our testing of the other systems.

Each of the other systems had its own merits: Siemens' HiPath Wireless AP-3620 access points are efficient with power, while Aerohive's HiveAP 340 offers an innovative alternative to controller-based designs and very high throughput. Motorola's new AP-7131 is still a work in progress and needs further software tweaks, but it too offers a unique design that soon will support as many as three radios on the same access point; that will enable enterprises to use Wi-Fi and WiMAX on the same access point.

802.11n throughput and latency

We assessed all systems in terms of pure 802.11n performance; mixed-mode performance in handling both 802.11n and legacy 11a and 11g clients; performance with a mix of common enterprise applications (for our "WiMix" test, in which wireless clients handle a mixture of frame sizes, see www.nwdocfinder.com/7132); power consumption; and system features.

The first question when it comes to assessing 802.11n technology is: How fast will it go? We answered that by measuring throughput across eight access points, each moving traffic between 20 wired and 20 802.11n wireless clients (see "How we did it," www.nwdocfinder.com/7134).

In these tests, access points used only 5GHz radios; in later tests, we turned on both 2.4GHz and 5GHz radios and used a mix of 802.11n and non-802.11n clients. For now, however, the focus was on pure 802.11n throughput and latency.

Using the VeriWave WaveTest WT-90 traffic generator/analyzer, we pounded each set of devices with short, midsize and large frames (in separate tests) to find the highest rate where the access points forwarded all traffic without loss — the throughput rate.

One significant finding is that traffic direction matters. In separate tests with frames moving downstream (from Gigabit Ethernet to wireless clients), upstream and bidirectionally, throughput rates varied widely.

In the downstream tests, Siemens' access points moved large frames the fastest among all systems (see graphic, above). Overall system throughput was greater than 2Gbps, or nearly 259Mbps on each of eight access points. Overall system throughput for the other three vendors' access points when handling large frames was between 1.89G and 1.94Gbps.

Upstream traffic generally achieved the highest rates. The Aerohive access points came out tops in the 802.11n upstream tests, moving traffic fastest for all three frame sizes. The HiveAP 340's throughput for large frames headed upstream — 2.110Gbps, or nearly 264Mbps per access point — was the fastest data rate we recorded in the entire test.

These results are good news for all vendors: Even the slowest result is dramatically higher than the roughly 25Mbps per access point available from current 802.11g or 802.11a products. In the best case, throughput is better than 10 times higher with enterprise-grade 802.11n gear.

While access points generally moved large frames close to the theoretical maximum rates in the downstream and upstream tests, it was a different story with bidirectional traffic. Aerohive's access points were fastest by far, moving large frames bidirectionally around 2.7 times faster than the slowest access points (which were from Siemens).

The top rate bidirectionally, even for the Aerohive access points, was around 70% as fast as its upstream-only rate. Limitations in internal bus capacity, direct memory access transfer capacity and memory optimization may explain the difference in rates.

So far, we've concentrated on large-frame testing, which generally produces the highest rates. Throughput differences for short and midsize frames were more pronounced than differences for large frames; in some cases we even weren't able to complete throughput testing.

Packet-processing horsepower is the key determinant of throughput, and that in turn depends on the access point's CPU and the firmware that shuttles frames to and from the CPU. Given a heavy-enough load, an access point may degrade VoIP or video responsiveness, slow TCP con-

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nections or become unresponsive in testing.

We're presenting throughput in both bits and frames per second (fps), making obvious the effect of packet-processing limits. With short frames —which are the most common type on enterprise networks, mostly because of TCP acknowledgements — frame rates varied widely.

The Aerohive access points were fastest at moving short and midsize frames downstream, in both cases by a wider margin over other vendors than in the large-frame tests. However, no system came close to the theoretical limit of around 1.5 million fps in the short-frame tests. Because many applications use short frames — including VoIP and anything running over TCP (for acknowledgements) — lower throughput with shorter frames can have adverse effect on application performance.

We were unable to complete upstream testing with the Motorola and Siemens access points. Two issues with the software Motorola supplied for its AP-7131 made it impossible for us to obtain throughput results in testing with 88-byte frames. Motorola says it has fixed these problems and has obtained significantly improved results with a new software version now available to customers. We did not verify this assertion. We were unable to obtain throughput results with the software version Siemens supplied with its HiPath Wireless AP 3620, not only with 88-byte frames but also with 512-byte frames in both upstream and bidirectional tests.

It's an industry-standard practice to find the throughput rate using a binary search, offering varying loads in successive iterations. The Siemens access point would become unresponsive after receiving heavy loads from the VeriWave test instrument, making results from all subsequent test iterations invalid. In tests with 88-byte frames, the Siemens access points rebooted in some cases.

Siemens says this problem does not occur on customer networks, and that its access points wouldn't have reset if we had disabled a watchdog timer in the access-point software. Throughput tests are by definition stress tests, and aren't intended to represent the "real world," the "WiMix" tests (see www.nwdocfinder.com/7132) are a better representation of the traffic enterprises actually handle. Also, the fact that access points became unresponsive or rebooted troubles us; this shouldn't happen no matter how heavy a load users throw at them.

We also measured latency and jitter (latency variation) for 802.11n access points (see graphic, this page). Minimizing delay obviously matters for such time-sensitive applications as VoIP and video, but it also affects anything running over TCP — and that's almost all traffic in enterprise networks. Delay a packet too long, and TCP stacks can respond with rate throttling, retransmissions and even connection timeouts.

Latency and jitter were highest when packets were moving downstream from Ethernet to wireless clients. This is to be expected, given that frames move from a faster medium to a slower one in this direction.

Bluesocket's access points delayed packets the shortest amount of time in most of the downlink and uplink tests, often by wide margins over other access points for downstream traffic. Also, the difference between average and maximum delay was generally lower for Bluesocket access points compared with those from the other vendors.

That said, average latencies for all access points were on the high side. Real-time application performance begins to suffer from delays of 10 to 20 millisec or more, and we measured many instances of much larger delays. Aerohive noted that we measured latency only at the throughput rate (as RFC 2544 requires us to do) but not with lower loads, in which latency and jitter can be far lower. This also may have reduced the sizable differences between average and maximum latencies.

Regarding those differences, the Aerohive and Siemens access points exhibited very large maximum delays in some tests involving 512- and 1,518-byte frames. In one case, the Aerohive access point delayed a few packets for 18 seconds, easily long enough to disrupt virtually any application. In this case, an issue with firmware caused the access point to buffer some packets from a previous test run until we offered new traf-

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802.11n latency and jitter

For such real-time applications as voice and video, latency and jitter (latency variation) are even more important than throughput in ensuring adequate application performance. For these measurements, conducted concurrently with the 802.11n throughput measurements, lower numbers are better.

MEASURED ACROSS EIGHT ACCESS POINTS, EACH WITH ONE 5GHZ RADIO ACTIVE

Direction	88-byte average latency (microsec)	88-byte maximum latency (microsec)	88-byte jitter (microsec)	512-byte average latency (microsec)	512-byte maximum latency (microsec)	512-byte jitter (microsec)	1518-byte average latency (microsec)	1518-byte maximum latency (microsec)	1518-byte jitter (microsec)
Aerohive downstream	23,540	83,720	3,723	61,750	18,400,000	3,382	144,500	18,100,000	10,130
Bluesocket downstream	**7,658**	**50,460**	**755**	**12,260**	**59,980**	**736**	**39,390**	**137,800**	**1,540**
Motorola downstream	23,830	159,000	3,552	30,670	298,300	4,938	42,250	318,100	4,989
Siemens downstream	25,460	144,300	1,275	35,160	256,300	1,433	64,850	316,400	2,090
Aerohive upstream	9,384	49,050	20	1,637	65,470	75	**975**	**80,180**	**130**
Bluesocket upstream	261	**32,060**	**14**	638	**64,150**	43	2,723	159,200	567
Motorola upstream	No valid result	No valid result	No valid result	350	80,580	39	1,821	111,900	282
Siemens upstream	**237**	42,630	28	**268**	72,350	**32**	3,101	111,200	528
Aerohive bidirectionally	**4,080**	**68,930**	**645**	**6,680**	**80,390**	**944**	13,980	116,800	2,049
Bluesocket bidirectionally	23,800	254,000	4,166	26,860	370,100	2,844	27,750	636,700	8,987
Motorola bidirectionally	No valid result	No valid result	No valid result	65,720	1,370,000	11,130	108,600	1,110,000	16,650
Siemens bidirectionally	No valid result	No valid result	No valid result	No valid result	No valid result	No valid result	**992**	**36,630**	**108**

"No valid result" indicate hardware or software issues with the system under test prevented us from obtaining a valid measurement for this test case.

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fic. During our tests, Aerohive supplied a new firmware version that corrected most, but not all, instances of this behavior. Again, latency and jitter may be lower with lower loads.

Maximum latency for the Siemens access point was greater than one second in some cases. Siemens again noted that this was a stress test.

Mixed-mode throughput and latency

These tests offer a thorough picture of 802.11n performance, but few if any enterprises will deploy 802.11n-only networks on day one; instead, they're likely to deploy a mix of 802.11n and legacy wireless clients.

To get a sense of how access points would handle multiple client types, we asked vendors to enable both 2.4GHz and 5GHz radios in their access points. Then we associated 16 802.11n clients to each radio, plus four 802.11g clients to the 2.4GHz radio and four 802.11a clients to the 5GHz radio. We did not use legacy 802.11b clients because they're becoming scarce and they would have dragged down rates for all clients.

CPU processing power and bus bottlenecks were even bigger factors in these mixed-mode tests than in the 802.11n-only setups. That's because access points must service frames headed to and from two radios rather than one. And because legacy clients run at slower rates (thus keeping 802.11n clients off the air at least part of the time), throughput was generally lower in these tests (see graphic, below). In fact, when averaging all bit rates for all vendors, throughput in the mixed-mode tests was only 24% that of the average of all results from the 802.11n-only throughput tests.

One thing that did carry over from the 802.11n-only tests was the top performance of Aerohive's access points, at least with midsize and large frames. The Aerohive access points generally were fastest in downstream, upstream and bidirectional tests. A glitch with the software image we tested, however, prevented us from testing the Aerohive access points with 88-byte frames in the mixed-mode configuration. Aerohive says it has since fixed the software issue, but we did not verify this. The same is true for Motorola: The vendor says it corrected software issues after our test window, but we did not verify this.

Rates were generally highest for upstream traffic, as in the 802.11n tests. However, unlike the 802.11n tests, rates trailed off dramatically for bidirectional and downstream traffic. Further, even the very highest upstream result was nearly 30% lower than in the tests with only 802.11n clients, despite two radios being active and thus twice as much capacity theoretically being available.

Because few applications involve traffic in one direction only, and because few enterprises will run 802.11n alone on day one, our results suggest that network managers shouldn't expect the same high rates from mixed-mode deployments as they should with 802.11n-only setups. Rates in these tests are far higher than would be possible with 802.11a/g access points; but they're not as fast as in the 802.11n-only tests.

One possible counterargument is that network designers should deploy only 802.11n clients on the 5GHz radio and dedicate the 2.4GHz radio to legacy 802.11b/g clients. This may be a sound network-design practice, but a quick look at frame rates belies the argument that overall performance would improve. None of the systems came close to meeting theoretical limits of around 1.5 million fps with short frames or 178,000 fps with long frames (measured across eight access points). The big gap between theoretical and observed frame rates suggests that access points' CPUs and buses will be limiting factors well before the systems hit any bandwidth bottlenecks.

We measured latency and jitter for mixed-mode traffic. Average latency was slightly lower than in the 802.11n tests, not surprising considering the lower loads involved. Once again there were big differences between average and maximum latencies, with the latter jumping well above one second in three cases involving the Aerohive and Siemens access points.

Certainly these high maximum delays can affect applications adverse-

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Mixed-mode (802.11a/g/n) throughput

Because few enterprises will run 802.11n-only networks on day one, we measured performance with a mix of 802.11a/g/n clients. In these tests, we used four access points with both 2.4GHz and 5GHz radios active. Frame rates were much lower in these tests than in the 802.11n-only tests, not only because of the presence of non-802.11n clients but also because using two radios put a much heavier load on each access point's CPU and internal bus.

MEASURED ACROSS FOUR ACCESS POINTS, EACH WITH 2.4GHZ AND 5GHZ RADIOS ACTIVE

Direction	88-byte frames (Mbps)	512-byte frames (Mbps)	1518-byte frames (Mbps)	88-byte frames (fps)	512-byte frames (fps)	1518-byte frames (fps)
Aerohive downstream	**120.5**	**691.0**	**812.0**	**171,232**	**168,698**	**66,862**
Bluesocket downstream	75.6	431.2	802.3	107,376	105,267	66,068
Motorola downstream	28.1	157.4	358.1	39,953	38,422	29,490
Siemens downstream	103.8	589.9	758.1	147,506	144,009	62,424
Aerohive upstream	No valid result	**1,093.2**	**1,491.3**	No valid result	**266,884**	**122,801**
Bluesocket upstream	**103.4**	431.2	1,407.0	**146,818**	105,274	115,858
Motorola upstream	No valid result	383.7	1,441.7	No valid result	93,672	118,720
Siemens upstream	91.7	515.9	856.9	130,273	125,953	70,560
Aerohive bidirectionally	No valid result	**660.4**	**739.3**	No valid result	**161,226**	**60,881**
Bluesocket bidirectionally	53.2	233.4	431.7	75,594	56,994	35,552
Motorola bidirectionally	No valid result	170.5	371.4	No valid result	41,637	30,579
Siemens bidirectionally	**97.7**	407.6	377.0	**99,510**	138,724	31,046

"No valid result" indicate hardware or software issues with the system under test prevented us from obtaining a valid measurement for this test case.

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ly. Because jitter remained relatively low across the board, however, it's likely that the high maximum latencies were caused by only a few stray frames (something we verified in the case of Aerohive's access points by examining capture files).

Power grabs

Power consumption is a key concern with 802.11n. The central question is whether the new 802.11n access points will draw more than the 12.95-watt maximum permitted in the existing 802.3af specification for PoE. Some of the more power-hungry access points may need even more juice than the 15.4-watt maximum that today's PoE power sources provide. (The 2.45-watt difference between device and power-source limits accounts for power dissipation in cables and voltage fluctuations; in practice, dissipation is much smaller, even over maximum-length cables, typically a few hundred milliwatts.)

Power use is a major issue for some enterprises, especially those that only recently put PoE switches or injectors in place. For network designers, the question is whether it's necessary to trade off some performance to stay within the power budget. The IEEE is working on a higher-wattage version of the PoE spec.

To determine maximum power draw, we enabled both radios on one access point from each vendor and associated 20 802.11n clients to each radio. We configured the access points to use channel bonding, ensuring maximum bandwidth and thus the highest possible power draw.

Working with a Fluke Corp. multimeter and probe, we took three measurements: Once with no traffic, to determine power usage when idle, and again with downstream flows of 88- and 1,518-byte frames, each offered at the throughput rate. The Fluke multimeter recorded the maximum power used in each test.

Clearly, the greenest of all the access points came from Siemens (see graphic, below). When idle, Siemens' AP-3620 used only 6.3 watts, less than half the limit for the existing PoE spec. Even under the heaviest load, the Siemens access point drew less than 11 watts, again well under the 12.95-watt limit. These results validate Siemens' claim that its 802.11n gear does not require a forklift upgrade of existing PoE infrastructure.

At the other end of the spectrum, Aerohive's HiveAP 340 was over the 12.95-watt line in all three tests, drawing as much as 18 watts when forwarding 1518-byte frames. Aerohive APs have a SmartPoE feature that can adjust power consumption dynamically to match that available from an 802.3af-compatible power source, but we did not test this. After reviewing its PoE test results, Aerohive said SmartPoE would have resulted in significantly less power draw, roughly equivalent forwarding rates and a smaller coverage area, but again we did not verify this.

Motorola's AP-7131 also exceeded the current PoE limit, but only when

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Big players missing in action

Almost as notable as the remarkable results in this test are some of the big names that didn't show up: Major wireless-LAN vendors Aruba Networks, Cisco and Trapeze Networks all declined to participate in this project.

Aruba's absence came as a surprise. The vendor has fared very well in previous *Network World* tests, and offered constructive input when we put together the test methodology.

When the company said it wouldn't play this time, citing a desire to devote resources elsewhere, *Network World's* editors appealed the decision all the way to the company's founders. But Aruba Net works still declined, saying it's determined to focus more on customer support than on public testing.

Cisco never really got involved in the test process. It did not provide direct input into the test plan, and it cited unspecified concerns with the testing tools as a reason for not participating. We pressed Cisco for specifics, but did not receive a response.

Trapeze offered input when we put this project together, agreed to participate and reserved lab time. Two days before its test slot, however, the company announced it wouldn't participate. A long but ultimately fruitless conference call failed to nail down a specific reason for Trapeze's abrupt about-face. At some points on the call, Trapeze cited resource constraints and/or issues with the test plan, but at other points it emphatically said these were not reasons for pulling out. We're still unclear on why Trapeze got cold feet.

We stand ready to include these vendors in future tests. For now, however, the only thing we can say is that some vendors were willing to have enterprise 802.11n performance compared in a neutral third-party setting and others weren't. When they're assessing gear from vendors that didn't participate, we believe it's reasonable for enterprises to ask about that unwillingness.

— DAVID NEWMAN

Maximum power consumption

Higher rates bring potentially higher power usage — so much so that in some cases existing power-over-Ethernet infrastructure may need to be replaced to support 802.11n. The magic number in this test is 12.95 watts, which is the maximum amount of power a standards-compliant PoE device should consume. Any device drawing more (indicated in red) might be able to work with existing PoE switches, but for best results, larger power supplies may be needed.

MEASURED ON ONE ACCESS POINT WITH 2.4- AND 5GHZ RADIOS ACTIVE

Direction	Idle (watts)	88-byte frames (watts)	1518-byte frames (watts)	Forwarding rate, 88-byte frames (fps)	Forwarding rate, 1518-byte frames (fps)
Aerohive downstream	**13.77**	**15.26**	**18.01**	**43,166**	**39,430**
Bluesocket downstream	9.90	10.05	11.47	27,708	27,327
Motorola downstream	11.99	12.69	**13.59**	22,488	24,626
Siemens downstream	**6.34**	**8.06**	**10.88**	36,500	34,998

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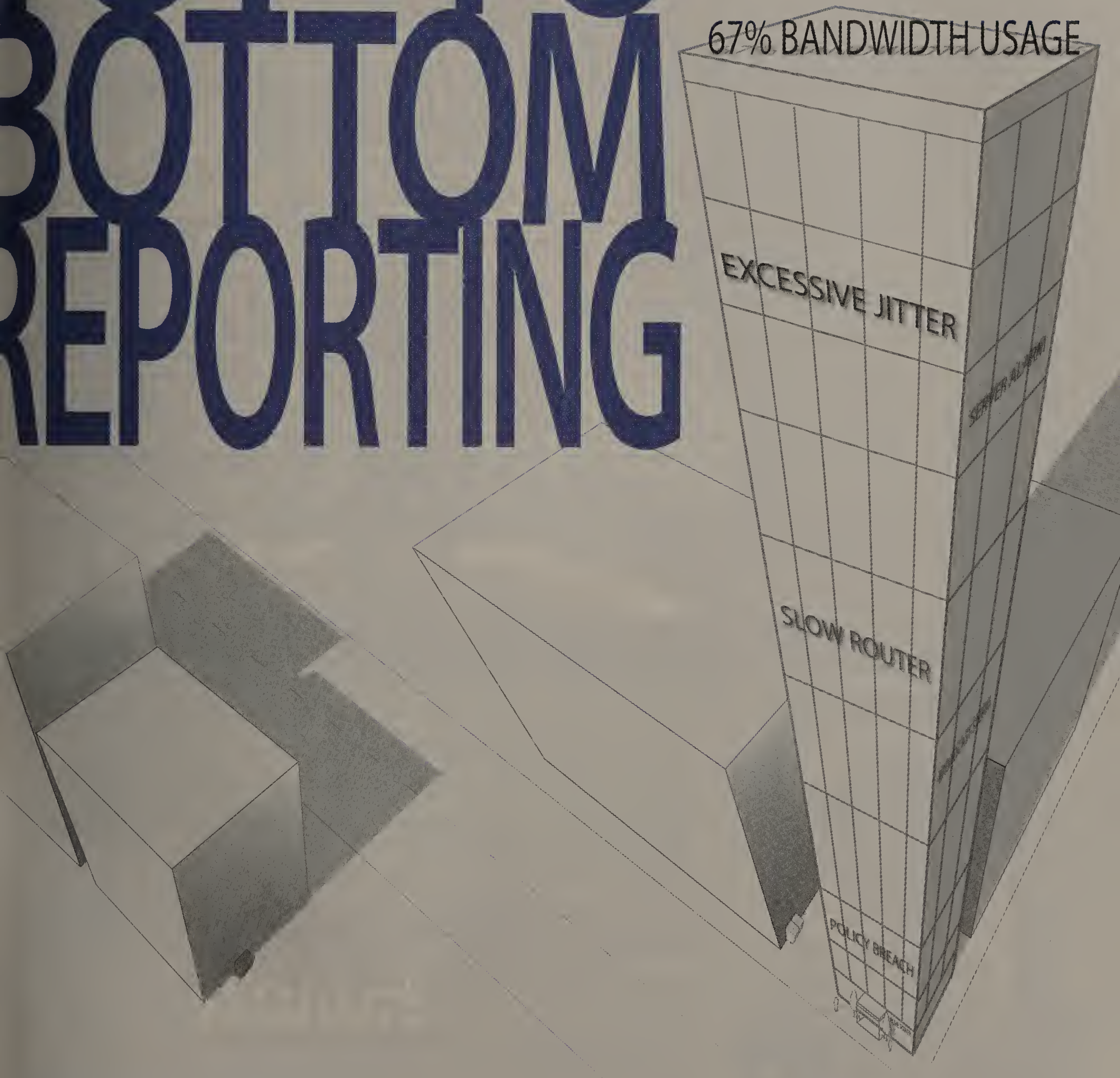

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Wireless
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handling 1,518-byte frames. While it's probably possible to run the Motorola access points with existing PoE gear (because of the 2.45 extra watts of headroom between devices and power supplies), it's safest to use new "PoE-plus" power sources with either the Aerohive or Motorola access points to supply power at levels above 15.4 watts.

As noted, there are power/performance tradeoffs involved in assessing PoE. Traffic rates for Aerohive's access points were much higher than those of the others in this event, but so was power usage. For enterprises looking for the fastest system, adding new power supplies may be worthwhile. On the other hand, enterprises planning on using existing PoE infrastructure are safe with either the Bluesocket or Siemens access points, because both stayed under the 12.95-watt limit in our tests.

The Siemens access points offered the best combination of power and performance: They delivered more traffic faster per watt used than any other system tested, while staying well under the power budgets of existing PoE gear.

Although this was mainly a performance test, we also compared products in terms of their feature sets (see "Features table" at www.nwdocfinder.com/7156). We should note that vendors responded to a features questionnaire, and we did not verify every answer.

Architecturally, we saw multiple approaches to WLAN design. The Bluesocket and Siemens systems are controller based, with the controller pushing out configurations and performing dynamic radio frequency management. Both vendors say they can manage other vendors' access points, providing captive portal and access control functions. Motorola also offers controller-based systems, but it supplied its new stand-alone AP-7131s for this project. The Aerohive system's design is unique: Instead of a central controller, multiple access points acting as a "hive" collectively perform that function. The vendor also supplied a central management system, but it's not required for access points to operate.

In terms of RF features, these access points are more alike than different. As noted previously, all use Atheros 802.11a/b/g/n radio modules. All use two transmit antennas, although all have at least three transmit antennas to use 3x3 multiple-in, multiple-out (MIMO) radios once these are available. Data rates are likely to rise once 3x3 radios start appearing either later this year or in 2009.

The Siemens AP-3620 offers three antennas that carry signals from both its 2.4GHz and 5GHz radios, while all other access points offer six antennas — three apiece for each radio. Siemens' access points also differed in supporting 2x3 MIMO operation (two transmit antennas, three receivers), while all other access points used 2x2 MIMO.

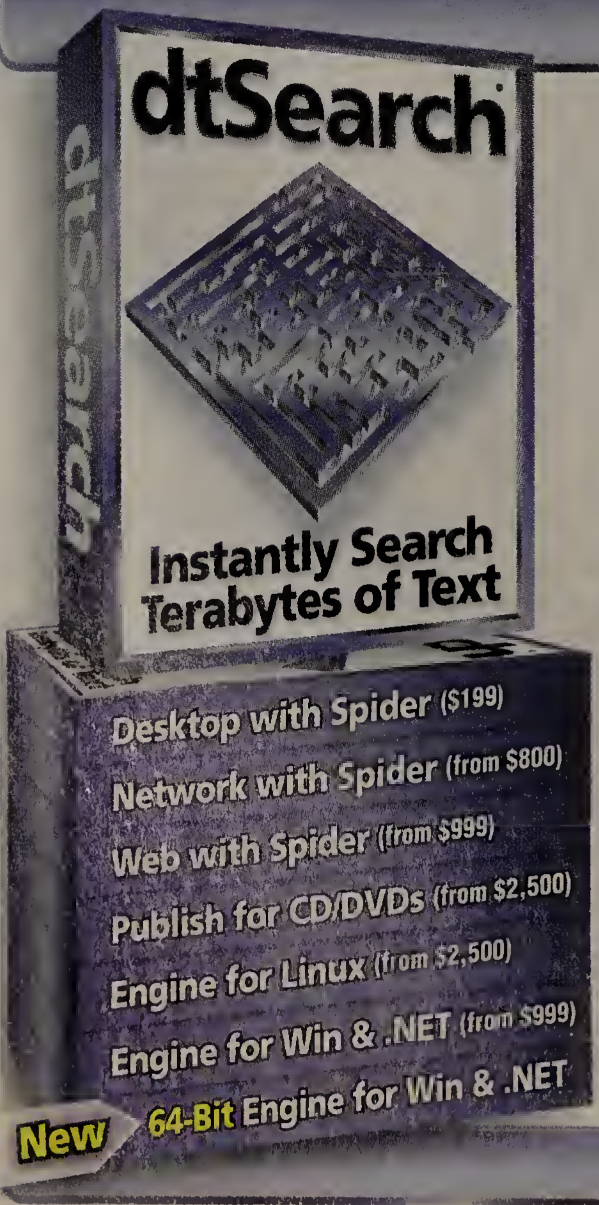
All systems except Motorola's supported dynamic RF control, adjusting signal strength in response to changes in the radio environment. All systems supported multiple extended service-set IDs per access point, a key feature when supporting multiple workgroups.

In the QoS arena, all systems support 802.11e/WMM (wireless multimedia) prioritization mechanisms to reduce latency and jitter for voice and video. All systems except Motorola's also prioritize traffic from Polycom Spectralink phones, which use a proprietary protocol.

All systems support the 802.11i/WPA2 suite of security mechanisms to provide authentication, confidentiality and message integrity. We used WPA2 personal mode to secure all test traffic. Also in the security arena, all systems have intrusion-detection and -prevention features; and all except the Siemens system provide a stateful firewall. Bluesocket's security feature set is especially extensive.

Even though all systems implement the same 802.11n protocol, and use the same chipset, we saw very different results. The new 802.11n systems offer vastly higher performance than their predecessors, and with further refinement of their software could represent a real step toward making wireless the default for enterprise connectivity.

Newman is president of Network Test, an independent test lab in Westlake Village, Calif. He can be reached at dnewman@networktest.com.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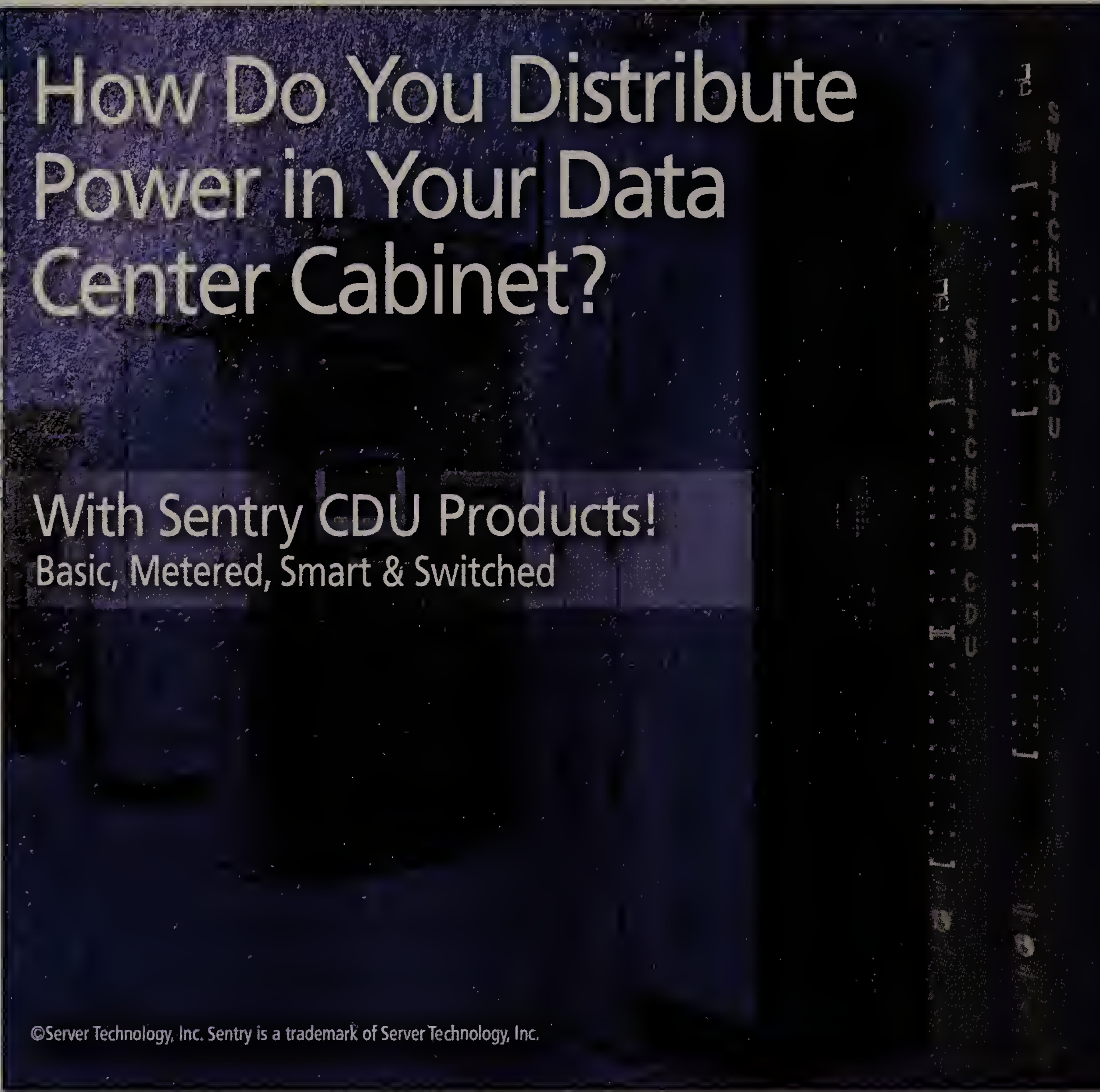

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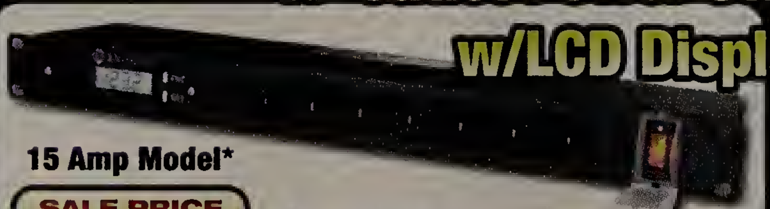

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Telecommuting

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need."

But while having strong network and Web tools in place is a big piece of securing a WAN for teleworkers, having smart, informed workers who follow company policies is even more important. In other words, even the most advanced network security system will be no match for human failings. Brown says this means that companies will have to adopt strict policies on what sites teleworkers can and can't access and to make sure employees know not to open personal e-mails or any e-mails that look suspicious while connected to the enterprise WAN.

"The biggest issue with security has to do with simple stupidity," notes Chuck Wilsker, the CEO of the Telework Coalition. "When the VA lost all those records, for instance, it was because someone took out a hard drive that had sensitive data on it."

4. Know that strong software can be just as important as strong network design.

Having solid broadband infrastructure for your teleworkers is all well and good, but it's also vital to have good software that can be used to provide updates and enforce security policies.

"Teleworkers should be able to download software from the corporate Web site, and once that software is loaded it becomes part of the software administration model," Bozich explains, using his company's teleworking services package as an example. "With our solution, you have the ability to set policies and push them down to all your clients. You have the ability to maintain a list of software requirements, and you can validate that the software is active and that it has the current revision of updates loaded on there."

Gaskin says many companies, particularly small and midsize businesses, should start looking at software-as-a-service (SaaS) as alternatives to more costly network infrastructure systems such as Microsoft Exchange servers. Gaskin says one of the more popular and accessible SaaS offerings is Google Apps, which an estimated 500,000 companies use for hosted e-mail, messaging and calendar applications. He also recommends that companies look at HyperOffice, the online collaboration software aimed at small businesses that includes intranet software, business e-mail services and document management services; and at Egnyte Software, a Web-based company that specializes in content management and hosting that puts company data securely within the cloud for workers to access.

> "The biggest issue with security has to do with simple stupidity. When the VA lost all those records, for instance, it was because someone took out a hard drive that had sensitive data on it."
>
> **Chuck Wilsker**
> CEO of the Telework Coalition

The advantage to using cloud-based software, Gaskin says, is companies can outsource their security issues to outside companies and rely less upon internal IT staff.

"Companies are getting better about rethinking applications from the remote user's standpoint," he says. "As more employees work at home, they're rethinking the applications and whether they should host them or not. This will make a huge difference in security for these companies."

5. Keep your wireless devices in line.

Gaskin puts it bluntly: the plethora of mobile devices latching onto enterprise WANs is "a giant pain in the ass." But with wireless usage increasing every year, companies will have to keep track of where all these devices are and what they are doing, both to keep the corporate WAN secure and to save money.

"Mobility can be either a big problem or a value ad," Bozich says. "One of the ways to enhance productivity is to make sure employees have proper access to corporate data at home on the broadband connection, or if they are traveling and are staying in hotel or at an airport… but it can also throw a wrench into how the WAN operates because more mobility can also mean less accountability."

Verizon's Brown says companies have to keep very close tabs on all wireless devices on their networks to make sure they have the most recent antispyware and antivirus updates pushed directly onto their systems. But she also notes that security is only one component in managing mobile devices, as companies need to make sure that their devices have the proper applications loaded onto them to let users take full advantage of wireless communications. Among other things, she says companies should look into getting simultaneous ringing capabilities that will ring up all of a user's devices when the employee's work number is dialed, as well as conferencing applications that make joining company meetings as easy as clicking a button.

"One of the things Verizon pushes is making work an activity and not a location," she says. "One of the best features we're pushing is the ability to set up a point-and-click application on BlackBerry devices to set up quick mobile conferencing."

If all this sounds like a headache for IT departments to deal with, that's because it is, Gaskin says. Rather than having one laptop or personal computer to manage from remote locations, the modern IT department has to juggle a wide assortment of PDAs and smartphones that all must be kept up to date with the latest security and business applications.

"If it was my company, I would not allow any wireless network access to the company VPN," he says. "If you're setting up someone to work at home, it's not too much to ask someone to work from their desk on a wireline network that you've set up for them." ■

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BACKSPIN

Mark Gibbs

Employee ghosts haunt your systems

People come and go in your organization all the time. A select few stay for years, while others pass through in just months or even weeks. But whether they are lifers or transients, they all leave a digital ghost behind when they exit — a trail of their interactions with your network and systems.

You'll find their spoor everywhere — e-mail on your mail servers, data on your file servers, and information on desktops, laptops and even smartphones. They will change settings on applications, contribute to wikis and blogs, file reports and create and edit spreadsheets, word-processing documents and presentations. That's where the ghosts come from.

So, what do you do with their leavings? You attempt to exorcise the spirits. You probably delete their server and e-mail accounts, remove them from LDAP servers, delete their access to FTP servers, remove their access privileges, and deal with the clots of data they left behind. If you're really thorough, you might even go so far as to purge them from your backups.

But when you do any of these things there's a chain of potential problems because all of their ghostly trails don't exist in splendid isolation. Remove their files without understanding how their work related to the bigger business picture, and, for example, the design and supportability of an entire product line could be compromised. Dump their e-mail messages and your ability to be in legal compliance could be lost. There are hundreds of potential consequences to removing their data.

"Ah," you might expostulate, (that's OK, we're all consenting adults around here), "I'll just remove access privileges for accounts and leave their data and e-mail where it is and keep an eye on whether it gets used." Nice try, Sparky, but that's not going to work.

The reason for its guaranteed failure is simple: You certainly don't know what their data really means. You can't possibly know what the use cases are for every file and whether the fact that it gets used is relevant to your business or a side effect of some other process.

And then there's the biggie: The assumption of employee loyalty. What if the original owner was disloyal and left a steaming pile of bits lying around that will eventually emerge to ruin your day?

So, here's what you can do: Rethink your data-handling architecture from the viewpoint of what users are allowed to do. As monumental as that sounds, there really is no other choice.

The problem is that without a centralized ID-management strategy that defines roles and privileges from an a-priori stance — that is, where you define explicit permission templates for every user and every access pattern he makes so you know exactly what you're allowing and what you're disallowing — you cannot possibly know enough about what is intended to be normal use and what signifies problems that are going to make your life a living hell.

This is a combination of identity management and strategic, top-down planning that displaces the old "strong passwords are good enough" approach because they aren't. As we work our way through the current financial hell there's one result that's guaranteed: Future compliance regulations will make Sarbanes-Oxley look like a high-school homework exercise.

The only way to deal with your user ghosts and their current and future dangers is to plan your way of exorcizing them. Otherwise, the demons of business failure and legal action will be right behind them.

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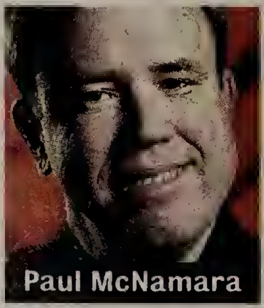

Paul McNamara

NETBUZZ

News, Insights, oddities

Predictive markets and online gambling

My knowing little about the ins and outs of online "predictive markets" hasn't kept me from wondering over the years why U.S. politicians don't attack this kind of Internet gambling with the same vigor they apply to online poker.

The question rose anew recently with a revelation by Intrade — an online predictive market based in Ireland — that someone had poured hundreds of thousands of dollars into an ill-fated — and from all accounts ill-advised — attempt to boost the value of "shares" backing the proposition that John McCain will be elected president. Was this fellow simply a wealthy and wild-eyed McCain supporter or, as one expert speculated, "one of the most foolish investors in the world"?

There was at least one other possible motivation that had eyebrows raised and tongues wagging: politics. This theory holds that McCain being seen as doing better among online "investors" might somehow translate to his doing better among real voters — given the conventional wisdom that persuadable individuals tend to gravitate to candidates who look to be winning.

"I've always wondered if someone might try this," wrote Josh Marshall on the political site Talking Points Memo. Me, too.

Intrade issued a statement saying that its internal investigation confirmed that a single "institutional investor" had been responsible for the "unusual price movements and discrepancies," but that none of Intrade's own rules had been broken. That's comforting.

Which brings me full-circle to my initial point: One of the cudgels used by opponents of online gambling is that government prohibition is needed because you never know what's going on behind the scenes with unregulated wagering sites.

Maybe the poker sites should just call themselves predictive markets.

The Laptop Drive of Shame, Part II

This was so much funnier when it happened to Brad — and to John — and to Tim — and to all the others who have told me about their own bouts of forgetfulness since I wrote a Buzzblog post called "Doing The Laptop Drive of Shame" (www.nwdocfinder.7221) in July.

Now I discover that it's not as amusing, oddly enough, when *you* are the bleary-eyed commuter staring at an empty passenger seat where your laptop — your one-and-only indispensable work tool — was expected be the passenger. Yes, indeed, my laptop was still at home.

I should have seen it coming. That morning my coffeemaker gave up the ghost. No caffeine at home, no laptop in the car. Coincidence? I think not.

American Airlines sues Yahoo

And it seems to me as though American has a legitimate beef.

From an Associated Press story: "The airline complains that when computer users enter American's trademark terms, such as AAdvantage, the name of its frequent-flier program, in a search they can be directed to competitors who pay Yahoo for the traffic."

The airline recently sued, seeking the usual laundry list of damages and legal costs but also an extra helping of Yahoo loot so as to buy "corrective" advertising.

This has been an ongoing legal issue in the search-engine world, and the matter is no doubt complex. But I'm having a difficult time seeing why Yahoo or any other search engine should be able to reap advertising dollars from a transaction whose very design is to exploit a third party's trademark without paying compensation.

Need to tell me why I'm wrong? The address is buzz@nww.com.

Where is the keyboard? Don't all BlackBerrys have keyboards? This just has a screen that—oh sweet sassafras, did it just click? It clicked right where I wanted it to. Is that supposed to happen? And is it supposed to feel so good?

What mad genius is behind this?

BlackBerry Storm

Introducing your business to the world's first touch screen BlackBerry.®
Only from America's Largest 3G Network.

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